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EMPLOYERS in any part of the world who require the services of superintendents, mining or civil engineers, metallurgists, chemists, mine or furnace foremen, or other assistance of this character, can have their wants advertised in the ENGINEERING AND MINING JOURNAL without charge.

A CORRESPONDENT who is in a position to know the facts, and whose letter will be found on another page, writes justifying our incredulity as to the announced value of the Alturas gold mine in Idaho. From what VERITAS says, it is evident that this enterprise is a good one for our British cousins to leave alone. Will our timid London mining contemporaries, or the able London *Economist*, please make a note of this for the benefit of their readers?

MR. C. P. SANDBERG'S letter on another page calls attention again to what is certainly one of the most important problems in the rail business. There can be no doubt but that our ordinary rail sections are much too light for the work put upon them, since the loads of freight-cars have increased from 20,000 to 40,000 pounds and that of locomotives in almost as great a proportion. Our roads would be far safer and the cost of road and of rolling stock repairs would be far less than they now are were the 80-pound, or even the 90-pound per yard rail adopted. Of course, the heavier rail involves a heavier first outlay, which many roads can not afford; but some of our companies that could buy the heavy rail still put on the same section that was properly adopted when the rolling stock was much lighter than at present. It can scarcely be doubted that the increased investment in the heavier rail would be an extremely profitable one for those who can make it.

THE BETHLEHEM MEETING OF THE INSTITUTE OF MINING ENGINEERS.

According to the circular just issued by the Secretary, the next meeting of the Institute will be held at Bethlehem, Pa., beginning May 18th. The plan informally considered at Pittsburg, of holding a summer meeting at Salt Lake City, has been, not abandoned, but necessarily postponed to another year. This is a double pity, because the Society of Civil Engineers expects to meet at Denver in June; and it would have been easy to arrange for a Salt Lake meeting of the Institute to follow that.

But since a far Western meeting proved impracticable, there is nothing but hearty commendation to be bestowed upon the selection of Bethlehem. The beauty of spring in the Lehigh Valley will be a revelation to those who go from New England or New York at a time when the approach of summer is still largely a matter of faith and hope in those regions. We may here remark that the choice of May 18th was made to avoid interference with the Chicago meeting of the Mechanical Engineers on May 25th, as well as the June meeting of the Civil Engineers.

As for putting the Bethlehem meeting in midsummer—that was out of the question, as we need hardly explain to any of the early members of the Institute. The tradition of the first and only Bethlehem meeting is still red-hot. It was in the first year of the Institute—fifteen years ago; and it was the first meeting after the organization of the society at Wilkes-Barre. The abundant hospitality of Mr. WEBSTER and others did what human power could do to alleviate the effects of the weather; and the visiting members gasped their thanks, and evaporated homeward. The thought of that meeting makes us perspire, and yet—we were not there—our vivid impression of it is merely reflected heat from the accounts of the sufferers themselves: but if such be our temperature, what must have been theirs!

The result was a unanimous amendment of the rules, which at that time called for four meetings a year. The midsummer meeting was abolished—it had, in fact, suffered destructive distillation—and it was not until some years had permitted blisters to heal and memories to cool, that a discretionary power as to the dates of meetings was reposed in the Council, which ventured in August, 1880, to hold a meeting in the Lake Superior region.

Meanwhile, the attractions of Bethlehem were most unjustly, though naturally, overlooked. All the news from Bethlehem was calculated to intensify the torrid recollections of the past. Bigger converters; more blast-furnaces; iron ore from the tropics—what dreadful increments of heat! What could we do at Bethlehem but "fritter" away the time? Professor FRAZIER, of the Lehigh University, published a paper on "The Economy of Fuel in Anthracite Blast-Furnaces," and another on "The Mechanical Work Performed in Heating the Blast." It was a heroic piece of audacity in him to "brazen it out" in that way, He must have known that every body who had attended the Bethlehem meeting believed that no fuel at all was necessary then, and that the blast heated itself. Many even explained the great growth of the Bethlehem Iron Company on the hypothesis that a place had been selected for its works where heat could be had in abundance *gratis*.

But these were all delusions. What the Institute encountered in 1871 was not Bethlehem, but August. And Bethlehem in May is—not what it was then, but something much more like Heaven. We believe that the Bethlehem meeting will prove one of the most delightful in the history of the Institute; and the students of that history know that in this phrase we promise a great deal. But we speak from knowledge of that picturesque region, which combines at this season the charms of the North and South.

As to the professional attractions of the place and its vicinity, we need

say nothing. The industry of the Lehigh Valley is not dead yet, by a long way. The most that can be said of it by its newer rivals, South and West, is, that it is not increasing as rapidly as they are; which is the common boast of all infants. Babies grow faster than men, the world over. As BÖRNE says: "The difference between nothing and one is greater than the difference between one and a million." But visitors to Bethlehem and its neighborhood will discover, first, that this elder seat of metallurgical supremacy is still able to maintain a vigorous competition; and secondly, that against the natural advantages developed elsewhere, the aid of skill and science has been invoked, to an increased and increasing extent.

Finally, the region abounds in active members of the Institute, and in people who appreciate the function and value of such organizations. We are thus guaranteed in advance a cordial reception—as the name of JOHN FRITZ at the head of the Local Committee, and the many well-known names of members and citizens associated with him, abundantly attest. *

THE INTERNATIONAL CONGRESS OF GEOLOGISTS.

A handsome pamphlet * of 109 pages, bearing the motto of the Berlin Congress, *Geologorum Conventus.—Mente et Malleo*, presents for American students the important and suggestive work thus far accomplished in the direction of harmonious international action for the unification of geological science and literature. It is true that the proceedings and conclusions of the Congress concerned primarily the classification, nomenclature, and color-scale to be used in preparing a geological map of Europe only; but they can not fail to have great influence upon the geologists of other countries. This is evidenced as to the United States by the action taken by the American Committee at a meeting held in this city, January 8th, 1886, when, on motion of Professor NEWBERRY, an address was authorized, "recommending to the United States and to the State Geological Surveys the acceptation of the color-scale adopted at Berlin, in so far as this does not necessitate the adoption of the classification and nomenclature of the map of Europe."

This address, as written by Dr. FRAZER for the Committee, constitutes the Preface of the Report before us; and we extract the following paragraphs as presenting with force and clearness the argument for international conformity.

"Let any one reflect on the useless retardation of science in the last and a large part of this century by conflicts over trivialities of nomenclature, classification, and units, and he will be anxious to avoid a way beset by these artificial obstacles. It were better for the growth of our science that geologists were united on unsatisfactory systems of nomenclature and coloration than that they should be divided among various good systems, because in the first case the improvements, when decided upon, would be accepted by all at the same time, and instead of a confusion of tongues at the outset, there would be a gradual evolution of a language which meantime was intelligible to all.

"The Committee therefore urges on all American geologists, and especially upon the Directors of the State and United States Geological Surveys, of which the publications are so justly prized in Europe, as close a conformity with the recommendations of the International Congress as they may feel able to accord; convinced as it is, that the influence of our own country in settling the most difficult problems, and in molding the future of geology, will be great in proportion as it is seen that we earnestly seek accord with other countries."

Major J. W. POWELL, the Director of the United States Geological Survey, was represented by Mr. MCGEE at the meeting of the American Committee which authorized this appeal; but he has written a lengthy letter to Dr. FRAZER (Note 2, at the end of this Report) which amounts to an energetic dissent from the general system of the European map, and a corresponding advocacy of the system adopted by his Survey. Major POWELL thinks "it is useless to attempt to secure international conformity to European methods until (1) the different European nations shall have themselves come to substantial agreement in classification and in the use of cartographic conventions, and (2) all nations shall be fairly represented—that is, shall have a numerical representation consistent with the importance of geologic development in each country—in the International Congress."

This is highly patriotic; for of course we are to understand that the "importance of geologic development" in the United States would give us a very large number of votes; but we fear it is not for the present practicable. Whether the European scale of colors will suit the geological map of the United States, can best be settled by experiment. The Council of the American Institute of Mining Engineers announced in its last annual report, read at the Pittsburg meeting, that such a map, colored according to the new scale by Prof. C. H. HITCHCOCK, would be presented to its members during the year. From a personal preliminary examination of the work, we see no reason to doubt that the geology of the country can be shown on this plan with all the definiteness required by the scale of the map. For purposes of greater detail, which in Major POWELL'S words require "that minor distinctions in the rocks shall be strongly accentuated," of course this general scale of colors will not suffice—whether for European or for American maps.

We do not find in Major POWELL'S letter any valid reason for not following the judicious advice of Dr. FRAZER, and adopting the fundamental scheme of the International Congress, as fast and as far as practicable. On the other hand, it would be, no doubt, premature to assume that all the features of that scheme are yet permanently settled, even for European usage. In this connection, the history of the three congresses hitherto held is significant. We condense it from Dr. FRAZER'S introduction.

The first International Congress was the result of the action of a committee at the Buffalo meeting of the American Association for the Advancement of Science, in 1876. The Congress met at Paris, in 1878, settled some preliminary matters, and fixed its next session for 1881 at Bologna. The Bologna meeting determined to undertake a geological map of Europe, and appointed a committee for this purpose, and another on nomenclature. The reports of these committees were discussed, modified, and adopted at Berlin, last September.

The representation of different nations in these gatherings has been not only unequal, but extremely variable, according to the locality. Thus at Paris there were 194 delegates from France and 110 from twenty other countries; at Bologna, 149 from Italy, and 75 from sixteen other countries; at Berlin, 163 from Germany, and 92 from sixteen other countries. In other words, the country in which the Congress is held has a representation much larger than all other countries put together. The next Congress is to be held at London, in 1888; and who can tell what the English geologists may not do, when they shall have the majority, with regard to some questions on which their vehement opposition was outvoted at Berlin? Will they continue to permit the Permian and the Carboniferous rocks to be grouped together as "Carbonic," or the Silurian and Cambrian as "Siluric"?

The pamphlet before us contains, besides a condensed abstract of the debates, the reports of the two main committees, and outlines of the reports of various national committees. From some typographical indications, we judge that these reports were put in type at different places—some of them abroad—and that they have been simply put together to make this book. There is no objection to that; but there is great objection—and we are sorry to note it against so experienced and skillful an editor and author as Dr. FRAZER—to the entire absence of an index or table of contents to this compilation.

A lithographed plate, showing the proposed international color-scale, is appended to the book. A limited edition only has been printed; and we do not know whether any copies of it are still for sale; but we advise any geologist who desires one, to make inquiry without delay of Dr. FRAZER, No. 201 South Fifth street, Philadelphia. *

* *The Work of the International Congress of Geologists and of its Committees.* Published by the American Committee, under the direction of Persifor Frazer, *Docteur-ès-Sciences Naturelles* (Univ. de France), Secretary. 1886.

CORRESPONDENCE.

[We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.
All letters should be addressed to the MANAGING EDITOR.
We do not hold ourselves responsible for the opinions expressed by correspondents.

The Alturas Gold Mine, Idaho.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: I have before me your issue of March 27th, 1886, in which I note, with mixed feelings of pleasure and surprise, the notices of the various contemplated mining ventures of English corporations.

One in particular struck me as either a monstrous misrepresentation of facts, or else a marvelous series of typographical errors. I refer to the Alturas Gold, Limited.

Having lived in this camp for the past two years, and during that time managed the only acknowledged gold mine and 10-stamp mill here in that period, I may be pardoned if I say that I am in a position to know the facts concerning our little camp. We have enough to do to carry our own burdens, but to have to stagger under the load of a $5,000,000 reserve mine is hardly fair.

I know of no mine that has produced any such amount monthly as that quoted. The Last Chance mine is the only free gold mine worked; all others, while having a percentage of gold in their bullion that may be represented by the figures 35 gold to 850 silver (as the fineness), are reputed to be silver mines.

Mr. P. O. Charles, M.E., has kept his visit very quiet, as no one here knows such a person, and I have not heard of him. Could it not be that all the alluring figures given refer to some *other* camp?—Atlanta, Georgia, for instance, as there is as much probability of finding a $5,000,000 mine there to-day as there is of finding one here this summer. You may well say, "We take little stock in such estimates." Very respectfully,

ATLANTA, IDAHO TERRITORY, April 4, 1886. VERITAS.

Steel Rail Sections.

We take the liberty of publishing the following extracts from a private letter of Mr. C. P. Sandberg, the eminent railroad engineer:

"I believe the rail question is a most important one, and a great deal to be done in it yet. What is safety and economy in the form of rails depends upon the price of steel; and as this is lower almost yearly, it changes; but to get this into engineers' heads is the question. Quality will go a long way, and no one ought to appreciate good material better than I, having been brought up in Swedish iron making; but for rails, the limit where quality will not go farther, and quantity or body steps in, presents itself sooner than for other railroad material. Again, this unfortunate overscheming of rail-sections, which prevents our rolling rails of enough hardness to get maximum of wear, has turned every thing upside down. All your late American sections are too thin in the flanges, and no maker puts more than 0·25 per cent carbon in them. If

there were 5 pounds more in the flange, 0·50 per cent carbon could go in without risk of breakage. All this to save the stuff; and so the rails will not last half the time. Again, all your rails are too light for their rolling stock; 60-ton engines and 20-ton cars upon 60 or 70 pounds is simply madness, even with your sleepers laid 2 feet apart instead of 3 feet, as here; and if made up of all Swedish iron, the rails will not last, particularly not in your overschemed rail-sections. I am now speaking right against my own interest; for what I say tends to prevent me from having charge of inspecting any more American rails.

"I have just finished the Barrow contract order, and can safely say it will give satisfaction. Over 2000 mechanical tests of each blow have shown regularity and safety; but if I had had 5 pounds more in the flanges, I should have made the rails last 50 per cent longer. If steel gets cheaper with you, a great deal of good could be done in turning engineers' heads right; but as it is, they had better be where they are. Here in Europe, I have, through my late paper on rail-sections, started a revolution that I hope to see through. Fancy, we may have rails at $16 (£4 sterling, 100 francs) the ton, and yet in many cases they are as light as with you (save on the English lines), losing safety, economy, and comfort through too light rails—60 to 70 pounds per yard.

"I am now completing my paper with a 100-pound flange rail standard section, fitted up with angular fish-plates of the very type that has broken in America. But the weakest point of the line (namely, the joint) must go first when overcharged, whatever is the type of it. Fisher's joint, under these circumstances, would have done the same. The remedy that I suggest is therefore increase of rail-weight 50 per cent; increase of hardness in rail-steel 50 per cent. Then the joints will stand, and the rails too."

COAL, FIRE-CLAY, IRONSTONE, SHALE PRODUCTION OF GREAT BRITAIN IN 1885.

The English government has adopted the system in force here of issuing advance-sheets, giving the statistics of different industries in advance of the general report. A few weeks ago, we were thus enabled to give the production of iron and steel, and we now have the following figures relating to the production of coal in advance of the annual reports of the inspectors of mines.

The number of persons employed in and about the coal, fire-clay, ironstone, and shale mines, included under the Coal Mines Regulation Act, in 1885 was 520,632; 159,351,418 tons (2240 pounds) of coal were produced; 1,878,514 tons of fire-clay; 10,108,612 tons of ironstone, exclusive of ironstone worked at open works; 1,885,416 tons of shale and other minerals coming under this class. There were 1150 lives lost, or one life lost for 452 persons employed, and one life lost for 150,629 tons produced. There were 341 deaths in coal mines caused by fire-damp explosions, 439 by falls of roof and coal, 76 by shaft accidents, 219 by miscellaneous underground accidents, and 75 by surface accidents. There were 41,644 persons employed in or at the metal mines, and 64 lives were lost, of which 58 were underground.

The coal production in 1885 was 1,406,361 tons less than in 1884; 21,288,587 tons of coal were raised in Scotland, and only 109,035 tons in Ireland. The output of coal per person employed was 306 tons in 1885, as against 309 tons in 1884.

OFFICIAL STATEMENTS AND REPORTS.

Central Mining Company, Michigan.

From the directors' statement of the operations during the year 1885, we make the following extracts:

The production of mineral was $1357\frac{540}{2000}$ tons, and the quantity smelted was $1331\frac{995}{2000}$ tons, which yielded about 81 per cent, or 2,157,408 pounds of refined copper.

The following is a summary of the year's business:

PRODUCTION.

Copper sold and delivered	1,600,899 pounds.	$177,418.69
Copper on hand, sold	556,509 "	63,151.54
	2,157,408 "	$240,570.23
(Averaging about 11·15 cents a pound.)		
Silver		390.90
		$240,961.13
Mineral at mine December 31st, 1884, $139\frac{20}{2000}$ tons, at $145 a ton	$20,155.00	
Mineral at mine December 31st, 1885, $164\frac{1355}{2000}$ tons, at $145 a ton	23,919.56—	3,764.56
Net value of product of 1885		$244,725.69
Add interest received		2,333.06
		$247.058.75

COSTS.

Central mine, payments for labor, supplies, etc.	$130,151.27	
Add decrease in available assets at mine	24,079.56	
Working expenses at mine	$154,230.83	
Smelting, freight, and all other expenses, as per balance-sheet	36,185.42	
Net operating expenses		190,416.25
Showing a profit of		$56,642.50
The surplus from 1884 after disposal of copper on hand and payment of dividend was		211,639.98
Making the net surplus, December 31st, 1885		$268,281.88

As shown in detail in the statement of assets and liabilities, and out of which a dividend of two dollars a share ($40,000) was paid February 1st, 1886.

The foregoing figures show a gratifying improvement on the business of the previous year, which was due to the large increase in product. Some of the ground stoped during the year proved to be much more productive than could have been anticipated from the appearance of the levels, and gave an increased quantity of copper without increased cost; the running expenses at the mine being about the same as in 1884. It is too early in the year to estimate the amount that will be produced in 1886, but the product for the first two months is about equal to the average of 1885.

The mine having reached a depth of more than 2000 feet vertically, the capacity of our hoisting arrangements is now strained to the utmost, and will not be adequate to hoist from a greater depth. It has, therefore, become imperative that more powerful hoisting machinery should be erected during the coming summer, and preparations are making for a plant that will meet all probable wants for a long time to come. In view of this large expenditure, the directors have not considered it prudent to divide the entire earnings of the year among stockholders, but have reserved a portion of the same to be applied toward payment for the new machinery. The agent's report shows:

GROUND BROKEN.

Sinking in shafts and winzes $206\frac{8}{12}$ feet, average cost	$19.88
Drifting on vein $859\frac{5}{12}$ " " "	9.00
Stoping on vein $1849\frac{15}{36}$ sup. fathoms "	12.07
Stoping on vein $24\frac{102}{114}$ cubic fathoms "	32.82

The total amount of ground broken in openings and stopes is 2800 cubic fathoms.

PRODUCTION.

	Pounds.
979 barrels stamp copper, weighing	1,482,535
171 hogsheads barrel copper, weighing	522,395
325 masses copper, weighing	709,910
Total	2,714,840
Or 1357 $\frac{840}{2000}$ tons.	
Average yield of mineral per fathom of ground broken	969
Average yield of ingot per fathom of ground broken	785

STAMP MILL.

The expenses at the mill were as follows:

Labor	$5,985.49
2000 cords wood consumed	6,500.00
Lights, oils, shovels, etc	410.04
Repairs, materials, fixtures, etc	305.52
Lumber, freight and teaming	36.23
	$13,237.28

Tons of rock stamped	17,812
Yield of rock in mineral	$4\frac{16}{100}$ per cent.
Yield of rock in ingot	$3\frac{37}{100}$ " "
Cost of stamping and washing per ton	$74\frac{31}{100}$ cents.
Running time of 24 heads	$140\frac{3}{4}$ days.
Rock stamped per head, twenty-four hours' running time	$5\frac{37}{100}$ tons.
Rock stamped and washed per cord of wood consumed	$8\frac{91}{100}$ "
Cost per ton of breaking and selecting rock, and tramming to mill	$9\frac{80}{100}$ cents.

SINKING.

No 2 shaft has been sunk 97 feet, and is now 15 feet below the 26th level. A winze has been sunk from the 25th level to the 26th level. In sinking this winze, the vein has been very small for the greater part of the distance; but in the last 15 feet it has improved, showing a small but good vein in the north side of the winze.

DRIFTING.

At the bottom of the winze at the 26th level, we have drifted north about 25 feet; the vein is about 2 feet thick, and well charged with copper; for the last 10 feet of drifting, we can not take down the vein until some stoping is done, it being so strongly charged with copper. The 25th level south of No. 2 shaft has been extended $364\frac{3}{12}$ feet. The vein has been very variable, sometimes very small and poor, and again it opened out to 10 or 12 feet wide, and has exposed considerable good ground.

The 24th level has been driven $127\frac{6}{12}$ feet south of No. 2 shaft. The vein here also has been variable, but during the year it has shown some very good copper ground.

The 23d level, south of No. 2 shaft, has been extended $189\frac{4}{12}$ feet. The vein has been small, but has yielded some good stamp rock. At present, it is so poor that we have discontinued this drift, as it will not pay to work at the present low price of copper.

STOPING.

Most of the stoping for the past year has been done in the backs of the 24th and 25th levels, which have produced much better than any one would have expected from their appearance at the beginning of the year. We have not had any very large masses, but have had very rich stamp rock, with small masses and barrel copper. In the back of the 25th level, south of No. 2 shaft, we have twelve men now cutting a mass estimated to be about 40 tons. Most of the other stopes are looking very well.

CONSTRUCTION.

We have built a new boiler-house at the stamp-mill, and placed in it two new fire-box boilers, and a smoke-stack, 4 feet diameter and 70 feet high; and also, one new boiler and smoke-stack at No. 3 boiler-house, which puts us in excellent position, as far as boilers are concerned. We have taken out two of the old boilers at No. 3, and have had them repaired and re-set again, and shall have to do the same with the others.

Our steam-hammer still continues to work well and effectively in cleaning our barrel copper and small masses to a very high percentage, which you can readily see by comparison of percentage of 1883, which was cleaned by hand labor, and that for last year, which was cleaned with the steam hammer, with much less expense.

In conclusion, I am pleased to say that the mine looks much better than it did at the beginning of 1885. The low price of copper seems to be the only thing that is against us. Yours respectfully,

JAMES DUNSTAN, Agent.

The Institut Electro-Technique Montefiore.—This university in Liége was founded, about two years ago, by M. Montefiore-Levi. It is intended to educate electrical engineers in the same manner as the continental polytechnic schools are intended for the education of mechanical and civil engineers. The average number of lessons given on theoretical electricity is 70 per term, and that of technical electricity is 140 per term.

HERRESHOFF'S IMPROVEMENTS IN THE GLOVER SULPHURIC ACID TOWER.

Mr. J. F. Herreshoff, the well-known metallurgist, whose improvements in copper furnaces have so greatly increased their capacity and general efficiency, has made and patented a very important improvement in sulphuric acid towers, which he describes in his patent (No. 335,699) as follows:

HERRESHOFF'S IMPROVEMENTS IN THE GLOVER ACID TOWER.

Fig. 1 is a sectional elevation of this improved sulphuric acid tower. Fig. 2 is a horizontal section of the same on the line *c c*, Fig. 1. Fig. 3 is a horizontal section of the same on the line *k k*, Fig. 1.

The Glover tower is a brick-lined structure containing blocks of flint and coke or other acid resisting material. The hot gases from the kiln enter the tower near the bottom and pass out near the top, being cooled on their way up by the blocks of flint with which they are brought in contact. The tower is, however, also used for the purpose of concentrating the product of chamber acid up to 60 degrees Baumé and above, said acid being introduced at the top of the tower and allowed to trickle through the filling thereof. Water contained in the acid will be evaporated by the heat that is brought into the tower through the introduction of the gas. The main difficulty connected with the use of the Glover tower is, however, caused by the brick lining and by the lower brick arches, which support the filling; for, although the text-books say that the bricks should be acid-resisting bricks, the fact is, that no bricks have ever been made that can withstand the severe action of the hot acid gases and of the hot acid that is introduced into such towers. As a consequence, the brick walls are gradually eaten away, which greatly shortens the life of the tower, and which, moreover, renders the acid that is passed through the tower impure, in that the bricks yield their own elements up to the acid that corrodes them; hence, the sulphuric acid passed through such a Glover tower can only be used for a few purposes, because of its impurities. Again, the acid-absorbing iron and alumina from the brick of the Glover tower deposit a white scale of anhydrous sulphate of iron and alumina above the open arch of the tower, and thereby gradually stop up the openings, check the draught, and finally interfere effectually with the proper passage of the gas and acid through the tower. It is costly and difficult to properly clean out these deposits. When the bricks are more or less corroded by the acid, it happens at times that the tower will tumble in, thus causing stoppage of the whole acid plant, and a very serious loss of time, etc.

Fig. 1.

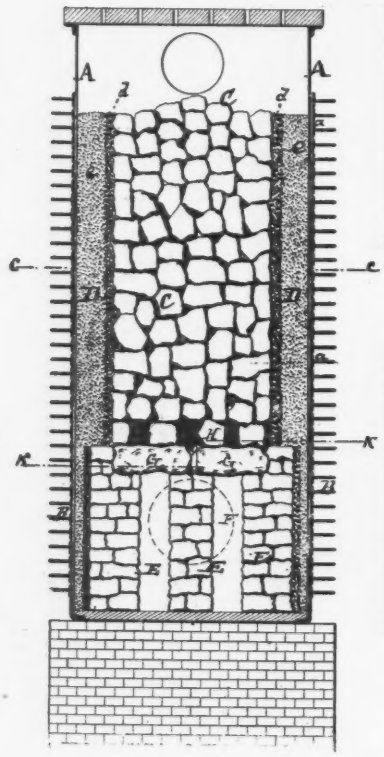


Fig. 2

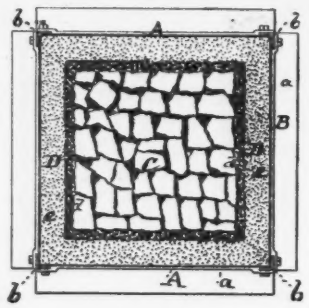
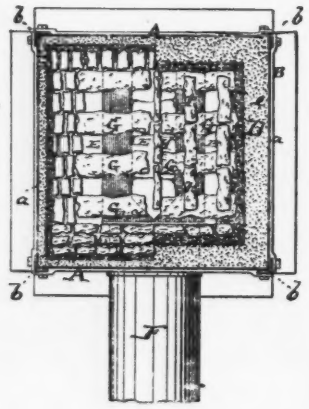


Fig. 3.



My present invention seeks to obviate these difficulties; and it consists principally in lining the entire tower within its outer sheathing of lead with quartz, glass, or other perfect acid-resisting material, in such manner as to prevent the acid reaching said lead sheathing, which, if reached, would be corroded.

The invention also consists in constructing the lower part of the tower entirely of quartz or its equivalent.

The improved tower has, like the towers now in use, an outer sheathing or casing *A*, of lead. The body of the tower is either of cylindrical form or of prismatic form. Figs. 2 and 3 represent it of the last-mentioned form. This casing or sheathing *A* of lead should be so constructed as to resist a heavy pressure from within, and yet at the same time it should not in the least bulge outwardly. To prevent this bulging outwardly, the whole outer surface of the lead casing or sheathing is inclosed in a resisting-wall *B*, of iron, which is constructed of series of strong iron plates *a a*, which are bolted at their ends to the upright posts *b b* of the tower. These posts are by preference also made of iron.

In this improved tower, the filling *C* and also the lining-walls *D*, that are intended to resist the corroding action of the hot gases and hot acid, are both constructed of a perfect acid-resisting material, such as glass or quartz, the latter being preferred as the best and most suitable substance. It would not be practicable to build the lining-wall *D* of blocks of quartz, the same as a brick wall is erected in the Glover tower, for the reason that quartz can not be cut into suitable blocks. I substitute for the brick wall in the Glover tower not a true wall in the sense of a self-sustaining wall, but a loose lining of crushed or ground quartz, glass, or analogous substance, the same being reduced to so fine an extent that it will pack closely enough to prevent the hot gases of the tower from reaching the lead wall *A*, to cause injury to said lead wall by corrosion or otherwise. The filling proper *C* of the tower consists of blocks or pieces of quartz of about five or six inches in diameter, and is intended to press strongly against the lining *D* of fine quartz, preventing it from falling inwardly, and in turn the lining is prevented from forcing the lead *A* outward by the outer wall *B* of iron.

In erecting the tower, I put in the lining *D* and filling *C* at about the same time; that is, I first lay a stratum or layer of the filling *C*, keeping it about twelve or eighteen inches away from the lead *A*, according to the thickness of the lining desired. The filling *C* is packed as loosely as possible, so as not to interfere with the flow of the gases and the acid; but at its edge or face that is to come next the lining, the blocks are placed as compactly as possible, and all the holes or cavities along its edge or face are filled with spalls of quartz, so that no holes remain along this outer edge of the filling *C* larger than, say, one half-inch in diameter. What I mean here is, that all the holes that show in the outer circumference of the filling *C* are plugged up from the outer side with the said spalls of quartz. Having thus erected a part of the filling *C*, there is a space left between the filling and the leaden wall or casing *A*, and that space is now filled as follows, to wit: First, next to the filling *C*, a layer *d*, of coarse quartz, is erected, a suitable sheet-metal plate, or, in case of a cylindrical tower, a suitable sheet-metal tube, being put in position to prevent this layer falling outward. The pieces that constitute this layer *d* should measure from three sixteenths to five eighths of an inch in diameter; secondly, the space between this layer *d* and the leaden wall *A* is filled with the fine quartz, which should be ground so that its largest pieces should not exceed three sixteenths of an inch in diameter. This latter lining *e*, of fine but loose quartz, constitutes the main and important feature of the tower; for gas, as I have proved by experience, can hardly pass through it, nor can it (the lining *e*) be forced outward, because of the resisting-wall of iron *B*. Instead of this wall *B* being made of iron, it may be made of other suitable strong substance. Nor can the fine lining *e* be washed into the center or filter portion of the tower, because the coarser layer *d* prevents the fine particles passing through to the filling proper *C*. I have tested this by pouring streams of water into a tower thus constructed, and found that no particles of the fine layer *e* came out with the water that escaped from the tower at the lower part thereof.

In the Glover tower, the lower or arched part is constructed of fire-brick and so arranged as to leave proper passage for the gases and acid; but any support of fire-brick can not last as long as desired, for the reason already stated, that an absolutely acid-resisting brick can not practically be produced. In lieu of this fire-brick arch, I erect two or more rough walls *E*, of quartz, their hight being such as to reach to or above the top of the gas-supply pipe *F*. The outer walls *E* are placed about six inches from the lead sheathing or casing *A* of the tower, and the intervening space is filled with fine quartz and coarser quartz *e d*, as shown in Fig. 1. In case of a very small tower, the central wall or post *E* can be dispensed with.

HIGH DUTY PUMPING-ENGINES.

Not very many years ago, the "hundred million duty" we heard ascribed to some Cornish pumping-engines was received with much incredulity by engineers and manufacturers, and not without some reason; for these high duty records were usually obtained only on trials of a few hours, when there was good reason to believe the coal to be selected and the trial so short as to make it impossible to get a fair working average of the amount burned. These records, though based upon crude and unreliable data, were not without their practical use; for the ideal "hundred million duty" has ever since been a standard to be aimed at by manufacturers and an example to be cited by engineers.

According to Phillips and Darlington, the average duty of the best pumping-engine in Cornwall was, in 1813, 26,400,000 foot-pounds per 94 pounds of coal burned. In 1823, this maximum duty had risen to 42,122,000 foot-pounds; in 1833, to 83,306,100 foot-pounds; and in 1843, to 96,100,000 foot-pounds per 94 pounds of coal consumed.

After this, during the next fifteen years, the duty declined, and but little value is now attached to the published records of Cornish pump duty, owing to the amount of assumption and "guess-work" in their calculation, and it has only been of recent years that thorough tests have been made of the actual duty obtained in pumping-engines, and even the best still leave some things to be desired.

Most tests are made with selected coal, and even the best does not take sufficient account of the quality of the coal. Even should the basis be 100 pounds of the combustible elements in the coal, or of the fixed carbon, it still would be only an approximation; for coals of the same chemical composition may have different heating powers. There should be adopted a certain standard efficiency of boiler, say 10 pounds of water from a standard temperature, etc., evaporated to the pound of combustible elements in the coal consumed. And then efficiency of pumps could be compared more accurately than is now possible.

Most of the English tests are made on the basis of 112 pounds of coal consumed; while, in this country, the standard is 100 pounds of coal. The percentage of ash in the coal is not always stated, nor is the efficiency of the boiler always given in the published summary of tests.

About fifteen years ago, American engineers began to realize, in actual, well-authenticated working tests, the ideal that had so long been cited, but which most of them had believed impossible of attainment. The distinguished engineer, Mr. E. D. Leavitt, Jr., of Cambridge, Mass., was one of the first to reach the standard in his pumping-engine at Lynn Mass., in 1873. Mr. George H. Corliss, with his magnificent machinery,

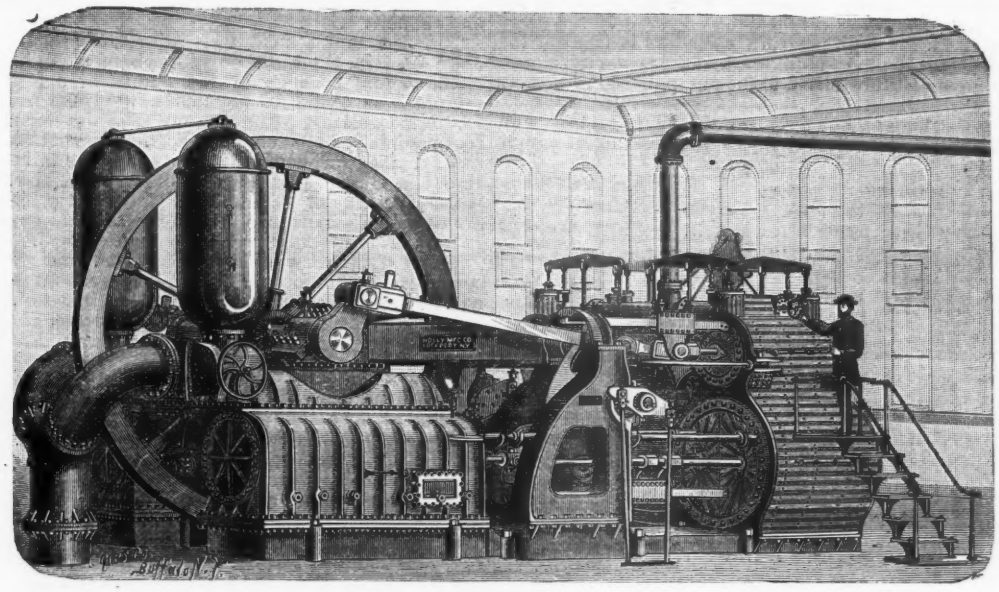


Fig. 1.

GASKILL'S COMPOUND PUMPING-ENGINE.

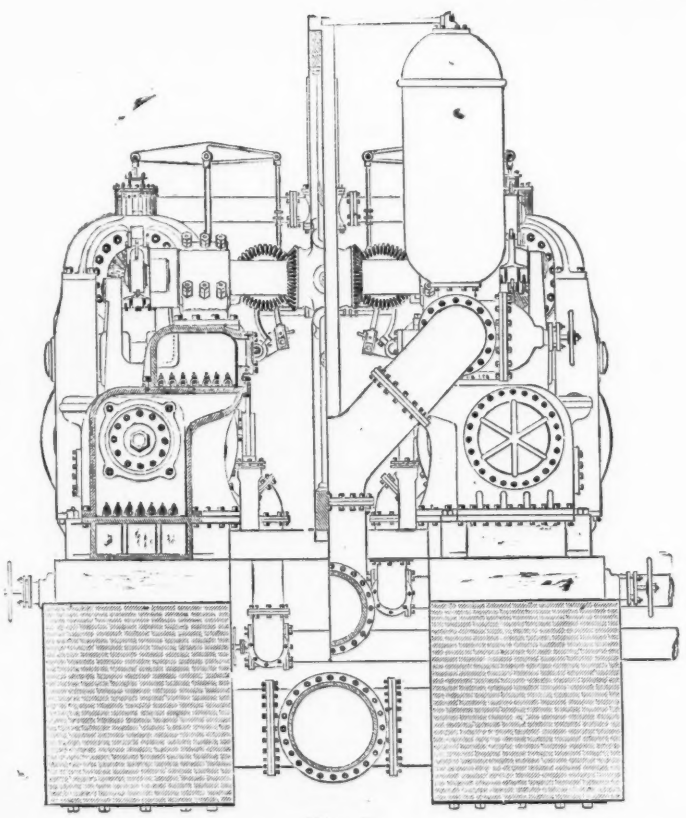


Fig. 2.

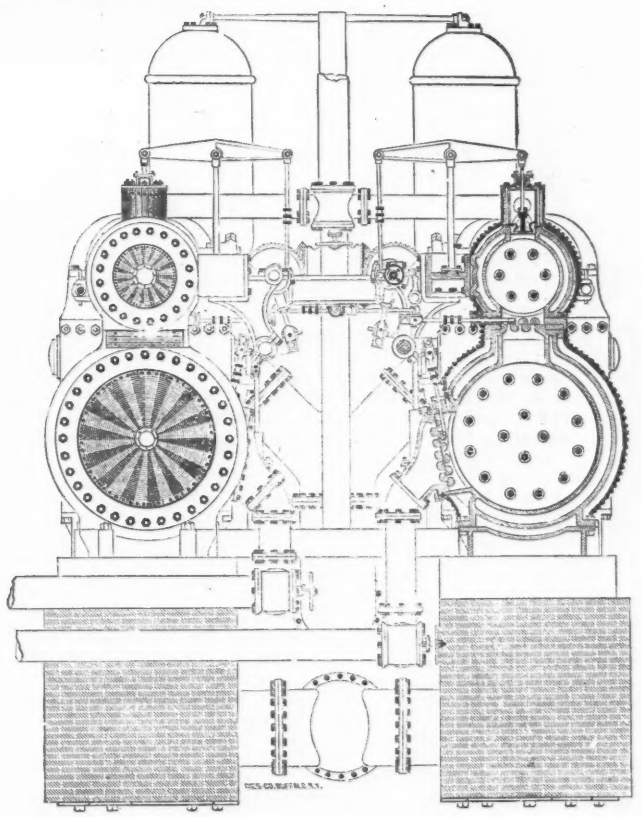


Fig. 3.

SECTIONAL VIEWS OF GASKILL'S PUMPING-ENGINE.

at Pawtucket, R. I., in 1878, made what is probably the highest duty on record, namely, 133,522,000 foot-pounds to the 100 pounds of coal consumed.

The following are a few of the American pumping-engines that have made in regular work such remarkable duty records as have, we believe, been unequaled in any other country, and which demonstrate again the great improvement made by American mechanics in this as in other classes of machinery.

EXAMPLES OF AMERICAN PUMPING-ENGINES.

LOCATION.	Date	Designer.	Method of test.	Duty.	Capacity.	Authority
Lynn, Mass .. .	1873	E. D. Leavitt	.....	103,92',215	4 938,000	Board of Experts
Lawrence, Mass	1876	"	.. ..	96,201 900	9,800,000	"
Pawtucket, R I.	1878	Geo. H Corliss	.....	133,522,000	2,5' 0,000	"
Providence, "	1882	"	....	113,035 000	9,105,604	S. M. Gray
Evansville, Ind.	1881	H. F. Gaskill	.....	88,688,866	4,000,000	John W. Hill
Memphis, Tenn.	1882	"	.....	99,072,857	4,000,000	"
Saratoga, N. Y..	1882	"	Directly from coal.	112,899,983	5,000,000	D. M. Greene and John W. Hill.
Saratoga, N. Y..	1883	"	"	106,838,000	5,000,000	Charles T. Porter
Omaha, Neb....	1883	"	10 lbs. evap.	102,000,000	5,000,000	J. D. Cook
Columbus, O...	1884	"	" "	115,400,000	10,000,000	T. C. Mendenhall (man
Leavenworth, Kan.	1886	"	" "	115,000,000	5,000,000	Thomas J. Whitman
Buffalo, N. Y...	1886	"	" "	125,907,297	15,000,000	John W. Hill

The record is so extraordinary that it can not fail to attract the attention of engineers; and in order that they may see how this duty is measured, we give some details of the Buffalo Gaskill engine, which has just completed a very severe test. The Gaskill engines, made by the Holly Manufacturing Company, of Lockport, New York, are of the compound crank, fly-wheel type, as may be seen in the annexed illustrations, Figs. 1, 2, and 3.

The Buffalo engine is of the horizontal beam rotative type, compound condensing, and is really *two* independent and complete engines coupled —with cranks at quarters upon the shaft—with one fly-wheel common to both.

The high-pressure steam-cylinders are placed above and parallel with the low-pressure steam-cylinders, and with pistons moving in opposite directions.

Each half of the engine contains one high-pressure steam-cylinder, one low-pressure steam-cylinder and one double-acting plunger-pump, with central packed gland.

The steam-cylinders are jacketed sides and heads.

The pumps are in line with the low-pressure cylinders, with stiff connections between the low-pressure pistons and the plungers. The housings that support the engine-beams are placed between the pumps and steam-cylinders, with the bearings for beam centers midway between the center line of high and low-pressure steam-cylinders.

The upper pins of the engine-beams are connected by means of short links with the pins of the cross-heads of high-pressure pistons, and the

lower pins of the beams are similarly connected with the pins of the cross-heads of low-pressure pistons.

The power developed in the high-pressure cylinders is transmitted through the engine-beams to the pump-plungers, and the power developed in the low-pressure cylinders is transmitted to the pump-plungers directly through stiff connections.

The low-pressure steam cylinders, housings for the beam-centers, and pump-barrels are tied, and braced together upon the horizontal center lines of the several parts.

DIMENSIONS OF ENGINE.

Steam Cylinders.

High-pressure cylinders (2), diameter, inches	33·000
Low-pressure cylinders (2), diameter, inches	66·000
High-pressure piston-rods (single), diameter, inches	4·500
Low-pressure piston-rods (double), diameter, inches	5·000
Stroke high-pressure and low-pressure pistons—engine "A"	47·875
Stroke high-pressure and low-pressure pistons—engine "B"	47·720
Steam-cylinders (4), jacketed	.....
Steam-cylinders, heads (8) jacketed	.....
Clearance high-pressure and low-pressure cylinders	0·025

STEAM-VALVES AND PORTS.

Cut-off valves, style, double-beat puppet.	
Cut-off valves, diameter upper seat, inches	9 125
Cut-off valves, diameter lower seat, inches	7·875
Cut-off valves, lift, inches	0·750
Cut-off valves, area of opening, square inches	40·055
Intermediate valves, style, gridiron slides.	
Intermediate valves, 5 openings, in seat	1″ × 13″
Intermediate valves, area of openings, square inches	65
Exhaust-valves, style, gridiron slides.	
Exhaust-valves, 10 openings in seat	1″ × 13″
Exhaust-valves, area of openings, square inches	130
Steam-ports high-pressure cylinders	3″ × 11″
Steam-ports high-pressure cylinders, area, square inches	33
Intermediate ports, from high-pressure to low-pressure cylinders	3·5″ × 20″
Intermediate ports, area, square inches	70
Exhaust ports low-pressure cylinders	3·5″ × 37·5
Exhaust ports low-pressure cylinders, area, square inches	131·25

CONDENSERS AND AIR-PUMPS.

Condensers, style, "jet."	
Condensers, number	2
Condensers, diameter, inches	54
Condensers, hight, inches	30
Air-pumps, style, single-acting.	
Air-pumps, number	4
Air-pumps, diameter, inches	24
Air-pumps, stroke, inches	27
Exhaust-pipe to condenser, diameter, inches	14
Injection-pipe to condenser, diameter, inches	6

PUMPS.

Pumps, style, double-acting plunger with central packed gland	
Pumps, number	2
Pumps, diameter plunger "A," inches	34·020
Pumps, diameter plunger "B," inches	34·030
Pumps, diameter plunger-rods (2), inches	6
Pumps, stroke plunger "A," inches	47·875
Pumps, stroke plunger "B," inches	47·720

The pump-valves are of vulcanized rubber set in composition shells, with an upwardly projecting stem guided in the hub of a cage that screws down over the outside of valve-seat. The valve-seats are of composition, screwed into the diaphragms of valve-chambers, without bridges or ribs, and presenting an unobstructed circular waterway when the valve rises from the seat.

Pump-valves, sets to each pump	4
Pump-valves, number in each set	252
Pump valves, diameter of opening in seat, inches	1·3125
Pump-valves, diameter of rubber disk, inches	1·7500
Pump-valves, thickness of rubber disk, inches	0·5000
Pump-valves, lift, inches	0·3125
Pump-valves, area through seats, one set, square inches	340·9560
Pump-valves, area through waterway at 5-16 inch lift, square inches	432·9520

BOILERS.

The boilers furnished by the contractor as part of his plant are of the return tubular type, set in independent furnaces, with independent smoke, steam, and feed-water connections, whereby any one or more of the boilers may be operated or laid off at will without interfering with the operation of the remainder of the battery.

The boilers are set to have three transits of the hot gas for the full length of shell, once under the shell, thence forward through the tubes, and finally back over the top of shells to the main flue at the rear end of setting. There are six boilers in the battery of the following dimensions :

Diameter of shells, inches		66
Length of shells, feet		18
Tubes, number		80
Tubes, diameter outside, inches		3·5
Tubes, length, feet		18
Grate, length of bars, inches		68
Grate, width of furnace (each), feet		6
Steam dome, one to each boiler, diameter, inches		33
Steam dome, one to each boiler, hight, inches		42
Heating surface, shell	164·507	
Heating surface, tubes	1319·472	
Heating surface, heads	18·413	
Total, one boiler, square feet		1502·392
Superheating surface, one boiler, square feet		90·206
Grate surface, one boiler, square feet		34·000
Ratio heating to grate surface		44·188
Cross-section of tubes, square feet		4·261
Ratio grate surface to cross-sections of tubes		7·979
Grate to boiler, front, inches		32·000
Grate to boiler, back, inches		30·000
Grate to boiler, floor of ash-pit, inches		20·000
Bridge wall concentric to boiler shell.		

The contractor's guarantees were :

First. A delivery of 15,000,000 United States standard gallons per diem of twenty-four hours, against a head of 185 feet above water pressure gauge, with a piston speed of 120 feet a minute on a twenty-four-hour trial.

Second. A duty of engine and boilers, as a plant, of 100,000,000 foot-pounds for each 100 pounds of coal consumed, with a steam pressure of 80 pounds on a 48-hour trial.

Third. A duty of engine and boilers, as a plant, of 90,000,000 foot-pounds for each 100 pounds of coal consumed, with a steam-pressure of 80 pounds, for 1800 hours' operation during a period of 90 days.

The working trial to begin within two weeks of the completion of duty and capacity trials.

The first and second tests were made for the city of Buffalo, by Mr. John W. Hill, the well-known mechanical engineer.

The actual capacity of the pumps at a piston speed of 120 feet per minute was found to be 15,588,210 gallons, and at 18 revolutions 18,626,256 gallons. The 48-hour trial developed a duty of 107,638,148 foot-pounds per 100 pounds of coal. The coal used was anthracite of the usual quality furnished to the city, and contained 10·20 per cent of ash. Had the contract based the duty upon the common conventional boiler efficiency of 10 pounds of steam to 1 of coal burned, an efficiency of common occurrence, the duty of the engines would have been 125,907,297 foot-pounds per 100 pounds of coal.

Mr. Hill's tests were most elaborate, and every detail was carefully considered and accounted for. We regret that the space at our command will not allow us to describe these tests in detail.

On the opposite page, we give the indicator diagrams of the high and low pressure steam-cylinders *B* and pump *B*. They are almost ideal cards.

The amount of lift allowed is just sufficient to make the area through the valve uniform, so that the water will pass with uniform velocity. The low lift of the valve and the elastic face make it noiseless in action at all speeds and pressures. A sufficient number of these valves are placed in the pumps to enable the water to pass through them at a low velocity.

The result of the 1800-hour working test was reported by Mr. P. Brennan, Chief-Engineer of the Buffalo Water-Works. The 1800 hours were made in 75 days, the engine running continuously. The average duty obtained was 98,232,166 foot-pounds per 100 pounds of coal. The anthracite coal contained on an average 12·7 per cent of ash. The lowest duty was 92,265,173, December 17th, the third day of the trial; and the highest, 106,445,002, on February 23d, near the end of the trial. The work shows a wonderful regularity.

These results show an extraordinary degree of efficiency in the Gaskill engines. It is needless to say that the workmanship is of the very best, while there are many features of originality in the design that contribute to the attainment of this remarkable duty.

The Holly Manufacturing Company, besides these high duty water-works engines, also makes mine pumps of various sizes.

IMPURITIES IN METALS.

Mr. W. Chandler Roberts-Austen, F.R.S., Chemist of the Mint, delivered lately at the Royal Institution, London, the first of four lectures upon Metals as Affected by Small Quantities of Impurity. He said that metallurgy has to deal at once with large masses and with small particles. The influence of the latter upon the former is out of all proportion to their relative quantities, and their action may be chemical or physical, or both. Minute impurities in metallic copper would render, he said, ocean telegraphy impossible. Geber proved that the "cry" of tin, or the noise that it makes when bent, can be removed by purification. Arsenic in the most minute proportion will restore the cry of tin, and its action in this respect has been known at least since the third century of our era; arsenic makes tin as brittle as zinc. The fact that such small proportions of foreign matter so alter the character of metals tended more than any thing else to confirm the alchemists in the doctrine of transmutation, and encouraged them in their attempts to make gold by artificial means. A little arsenic in melted lead will make it more fluid, so that when poured down an inclined plane, say of white paper, the lead will roll itself into small shot; with the arsenic absent, it will merely chill in a black streak upon the paper. The speaker proved this by experiment, and invited attention to the following figures :

ANALYSIS OF LEAD SHOT.

Lead, with small quantities of antimony, iron, etc	99·72
Copper	0 16
Arsenic	0·12
	100·00

This proves what a very small proportion of arsenic is necessary to produce the effect.

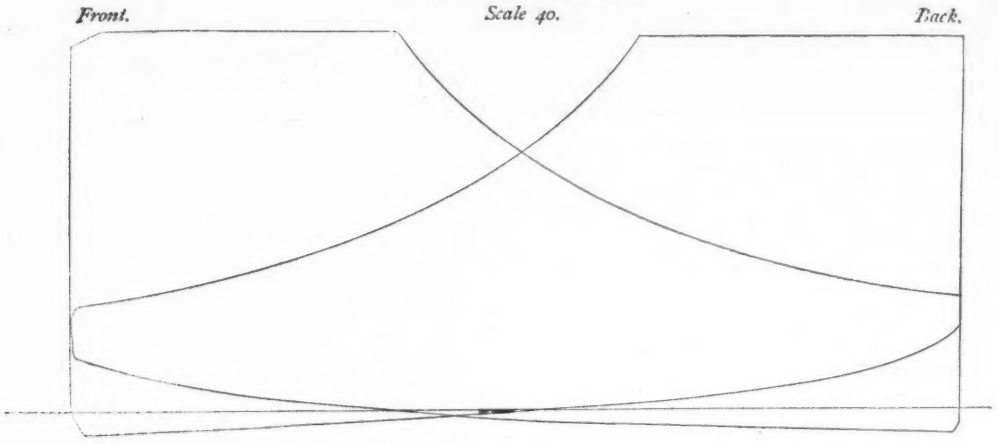
Zinc, said the lecturer, melts at 412 degrees C., and standard gold at about 900 degrees C.; but if less than 0·2 per cent of silica be added to gold, it will soften in the flame of a candle. This was demonstrated by experiment. A trace of antimony in melted lead will cause it to oxidize on the surface much more rapidly than would otherwise be the case, and by stirring the mass, it is soon transformed into a kind of pasty oxide. Cadmium also promotes the oxidation of pure melted lead, and that, too, with a play of the most beautiful colors. Mr. Roberts-Austen proved this by illuminating the surface of the melted alloy with a beam of parallel rays from the electric lantern, and projecting upon the screen an image of the surface of the molten mass; as the films of oxide formed, they were removed with a little scraper, to make way for fresh surfaces, having somewhat the colors of shot silks. He stated that it may not be generally known that copper can be gilt as well by the application of an alloy of lead and gold to its surface as it can by an amalgam of mercury and gold. On the application of heat, the copper absorbs the lead, and the gold is left on the surface. This process is recorded in a papyrus of the third century, now preserved at Leyden.

The alchemists, he said, through several successive generations down to the year 1746, authoritatively taught it to be a fact that all metals were composed of mercury and sulphur, combined in different ways; and those of them who claimed to have made gold almost invariably said that they had done so "by the aid of a powder received from a stranger." Dr. James Price, of Guildford, a fellow of the Royal Society, was the last of the alchemists who believed in the transmutation of the baser metals into gold; he lived in the eighteenth century. Raymond Lully was confined in the Tower by one of the English kings, in order that he might make gold for the mint.

Even the illustrious Robert Boyle believed in the transmutation of metals, because, in the usual orthodox way, he had "received from a stranger" a powder that would change 1000 times its weight of gold into a baser substance, and he did not see why the operation might not be reversed. He had probably made what is most dreaded at the mint, an

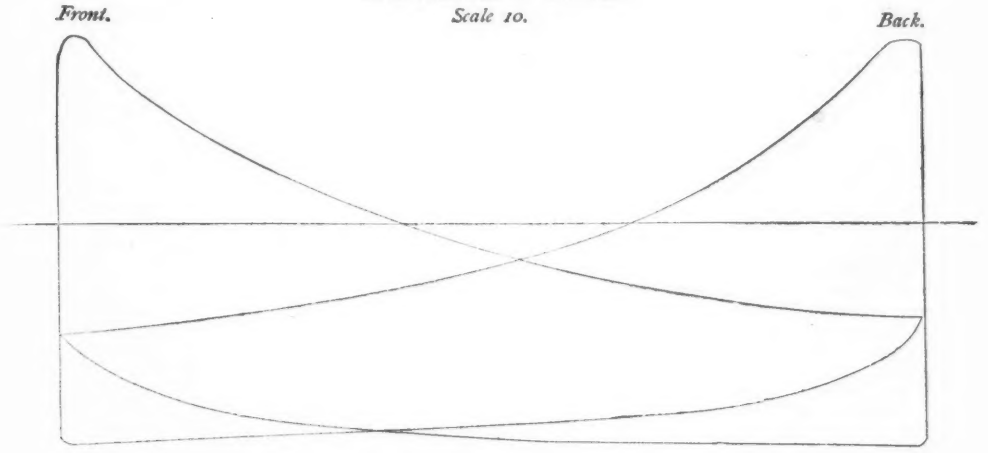
BUFFALO, N. Y., DEC. 3D, 11.00 A. M.
H. P. CYLINDER "B" ENGINE.

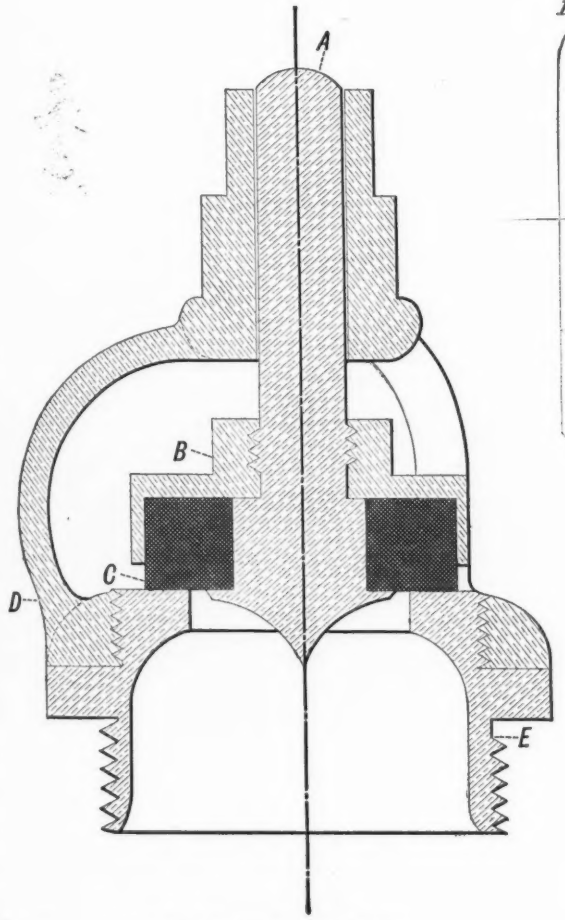
Front. *Scale 40.* *Back.*



BUFFALO, N. Y., DEC. 3D, 11.00 A. M.
L. P. CYLINDER "B" ENGINE.

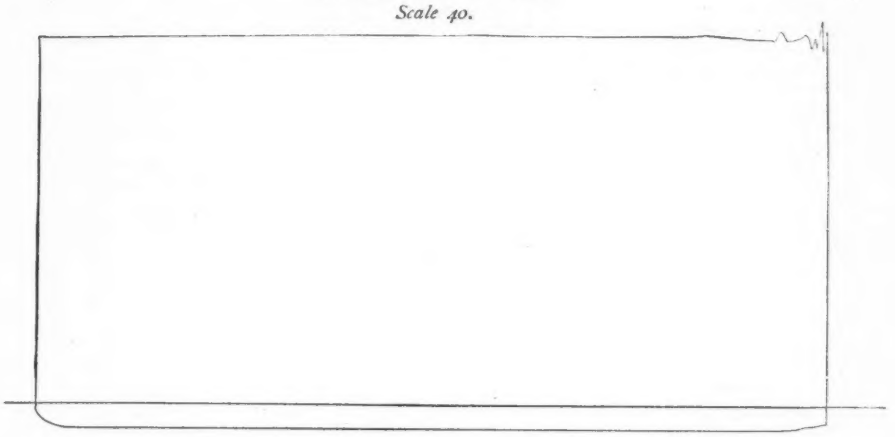
Front. *Scale 10.* *Back.*



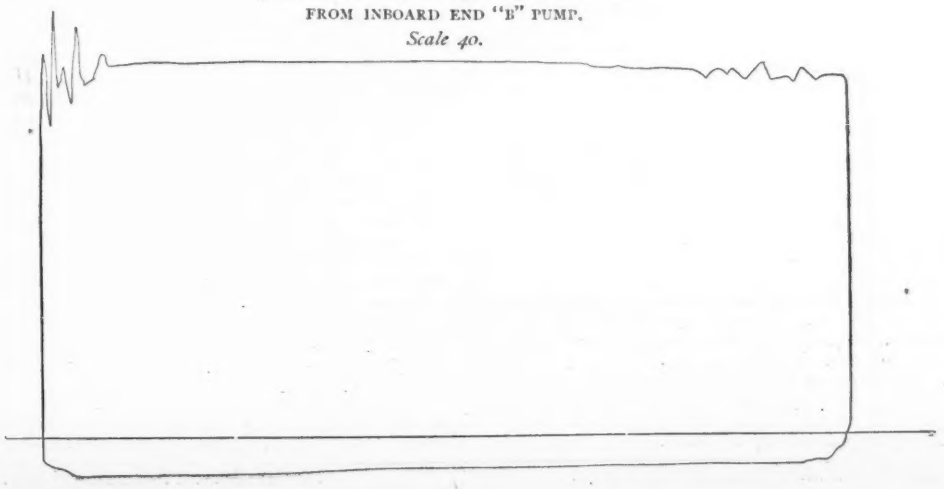


Gaskill Valve—Full Size.

BUFFALO, N. Y., DEC. 3, 1885, 7.00 P. M.
OUTBOARD END "B" PUMP.
Scale 40.



BUFFALO, N. Y., DEC. 3, 1885, 4.00 P. M.
FROM INBOARD END "B" PUMP.
Scale 40.



alloy of gold and lead. The lecturer here melted down one hundred sovereigns, and cast a little of the molten metal into a small bar, to show that the metal was strong and malleable and tough. To the remaining greater bulk of the molten gold, he, however, added a trace of lead, and cast the mixture into a large thick bar, which, when almost cold, and when held in the palm of the hand, broke into pieces upon being tapped with a hammer. A small trace of lead, he said, will reduce the breaking strain of gold from 20 tons to the square inch to 5 tons, as indicated by a testing-machine.

He then stated that palladium will absorb 900 times its volume of hydrogen gas, and give it out again when heated. A remarkable discovery has recently been made in France, that an alloy of rhodium and lead will absorb nitrogen and oxygen, and when heated give them off, as gun-cotton does, with explosive violence. He placed a small piece of rhodium, containing 17 per cent of lead, in a tube, and next withdrew the air from the tube by means of the Sprengel pump. The heat of a spirit-flame was then applied to the end of the tube containing the piece of rhodium and lead, and the alloy broke up with a small explosion, filling the end of the tube with metallic dust. The gases liberated were chiefly the same as those given off by ignited gun-cotton.

GERMANIUM.*

By Clemens Winkler.

In the summer of 1885, a rich silver ore of uncommon appearance was found in the Himmelfuerst mine, near Freiberg. It was recognized as a new mineral species by Prof. A. Weisbach, and named by him argyrodite. Mr. Th. Richter subjected the mineral to a preliminary examination with the blow-pipe, and found it to consist essentially of silver and sulphur. In addition to these, he also detected the presence of a small quantity of mercury, which is remarkable and interesting from the fact that this metal had never before been found in the Freiberg ores.

In the analyses that I made, I found that the mercury did not amount to more than 0·21 per cent. According to the purity of the material, the silver varied from 73 to 75 per cent, and the sulphur from 17 to 18 per cent. Small quantities of iron and traces of arsenic were also found. Though the analysis was often and carefully repeated, there was always a loss of from 6 to 7 per cent without its being possible by the ordinary methods of qualitative analysis to discover the missing body.

After several weeks of tedious search, I can now positively state that argyrodite contains a new element, very similar to antimony, but still very distinct from the same, which I have named Germanium. The detection of this element was very difficult, because the argyrodite was accompanied with minerals containing arsenic and antimony, which, on account of their similar behavior, and a total lack of a sharp method for separation, caused much difficulty.

Argyrodite, when heated with exclusion of air, preferably in a current of hydrogen, gives a black, crystalline, quite volatile, ready fusible sublimate, which melts to reddish-brown drops. In addition to mercury sulphite, it consists essentially of germanium sulphide. Germanium sulphide is a sulpho-acid; it is readily soluble in ammonium sulphide, and when reprecipitated by hydrochloric acid, in a perfectly pure plate, it forms a snow-white precipitate, which is instantly soluble in ammonium hydrate. In the presence of antimony or arsenic, the precipitate is always tinged more or less yellow.

On heating in a current of air, or in nitric acid, germanium sulphide is converted into a white oxide, which is not volatile at a red heat. It is soluble in potassium hydrate, and the alkaline solution, when acidified with sulphureted hydrogen, gives the characteristic white precipitate. Too great dilution prevents or retards the precipitation.

The oxide, like the sulphide, is reduced by hydrogen, the latter with greater difficulty on account of its volatility. The element has a gray color, and moderate luster, like arsenic. It is volatile at a bright-red heat, but with much greater difficulty than antimony. In volatilizing, it sublimes on the sides of the glass in crystals that have the appearance of sublimed iodine, show no trace of fusion, and can not possibly be mistaken for antimony.

Germanium, or its sulphide, when heated in a current of chlorine gas, forms a white, readily volatile chloride, which is more volatile than antimony chloride, and the aqueous solution of which gives a white precipitate with sulphureted hydrogen.

The determination of the atomic weight of germanium is to be made at once, even if only with approximate accuracy; it will show whether, as is to be expected, the new element will fill the vacancy existing between antimony and bismuth in the periodic system.

The Pennsylvania Railroad Benefit Fund.—The Pennsylvania Railroad employés who refused to accept the mutual relief plan as originally formulated, have had the scheme modified to meet their views. Membership is to be entirely voluntary, but no employé can become a member of the fund until he has been at least six months in the service. The sick benefit has been reduced to 40 cents a day, and Sundays will be included in the payment of disablement benefits.

The Henwood Method of Using Petroleum Fuel.—The question of liquid fuel is still engaging the attention of inventors in Great Britain. The latest addition to the various systems is an invention of a Mr. Henwood. According to *Bradstreet's*, a recent trial of a screw steamer of 120 tons was made on Shadwell basin of the London docks. The screw was driven at a speed of 120 revolutions a minute, with steam steadily maintained at 65 pounds pressure. As the result of experiments, it is stated that the consumption of fuel is three quarters of a pound per indicated horse, with a very high rate of evaporation. The principal feature of the new invention is, that the petroleum reaches the furnace entrance by gravitation, and is injected by steam taken from the boiler, air being admitted in regulated quantities. The furnace is primarily started by steam taken from a small auxiliary boiler placed upon the deck. The most important feature of the invention is the proper proportioning of the steam used in the furnace, so that its hydrogen is fully realized.

* From the *Berichte der Deutschen Chemischen Gesellschaft.*

GRAPHITE.*

By John A. Walker.

Occurrence.—From the tabulated list of useful minerals in the *Mineral Resources of the United States*, 1882, it will be seen that graphite is of too general occurrence to make of special value a list of the localities from which samples are received by the manufacturing companies for examination. There is a growing interest in this mineral. Some of the more recent discoveries would probably have been developed but for the remarkable cheapness of foreign graphite and the general business depression prevailing. The importation, while smaller than in any year since 1880, has kept the market fully supplied. The Dixon Company continues to be the only successful miner of graphite in the United States. Its mines, at Ticonderoga, Essex County, New York, are under the management of Mr. William Hooper, the inventor of some of our best ore-dressing machines, and who has been successful in producing from a 6 to 10 per cent ore the finest graphite in the world.

Graphite has been observed in many places throughout the Pacific States and territories; only in California, however, have any attempts been made to mine and market or otherwise utilize it in a large way. The deposit that has been most worked in that State is situated one mile north of the town of Sonora, Tuolumne County, from which some twenty years ago about 1000 tons of graphite were extracted, the most of which was shipped to England, France, and Germany, and there sold at the rate of about $100 a ton, a price that afforded the shippers some profit. But the impossibility of securing here any large quantity sufficiently pure for commercial purposes put an end to the enterprise, the labor of concentrating the crude material, which was largely mixed with slate and other foreign matter, having been expensive. Besides the Sonora deposits, graphite has been found in California at the following places: Near Summit City, Alpine County; on the border of Tomales Bay in the coast range of Marin County; near Fort Tejon, Kern County; at Tejunga, Los Angeles County, and at Boser Hill, Fresno County (both recent discoveries), and at several places in Sierra, Plumas, Marin, and Sonoma countries. In 1883, a deposit of graphite was found in the Sierra Mountains, Humboldt County, Nevada. The mineral here occurs in numerous small veins, some of it being quite pure; but like the deposits elsewhere on the Pacific coast, this possesses just now no special value. Graphite has also been found recently in Beaver County, Utah, but the quality of the mineral and the extent of the deposit remain to be tested. A deposit in Albany County, Wyoming, is reported as about 20 inches thick and sufficiently pure to be worked; no developments have been made, and the extent of the deposit is unknown.

Production.—During 1883, the Ticonderoga mines produced 550,000 pounds, and estimating the output of various other workings at 25,000 pounds, the total production for 1883 was 575,000 pounds, representing, at an average spot value of 8 cents a pound, $46,000. The output in 1884 was practically nothing. The accumulated stocks and the industrial depression caused the suspension of work at the Ticonderoga mines during 1884, and it is not known that any other mine was operated on a commercial scale.

Imports.—The following table shows the quantity and value of graphite imported and entered for consumption in the United States:

GRAPHITE IMPORTED AND ENTERED FOR CONSUMPTION IN THE UNITED STATES, 1867 TO 1885, INCLUSIVE.

Fiscal years ended June 30.	Unmanufactured.		Manufactured.	Total.
	Quantity.	Value.		
	Cwts.			
1867	27,713	$54,131	.....	$54,131
1868	68,620	149,083	.....	149,083
1869	74,846	351,004	.....	351,004
1870	80,795	269,291	$833	270,124
1871	51,628	136,200	3,754	139,954
1872	96,381	329,030	.....	329,030
1873	157,539	548,613	.....	548,613
1874	111,992	382,591	.....	382,591
1875	46,492	122,050	.....	122,050
1876	50,589	150,709	17,605	168,314
1877	75,361	204,630	18,091	222,721
1878	60,244	154,757	16,909	171,666
1879	65,662	164,013	24,637	188,650
1880	109,908	278,022	22,941	300,963
1881	150,927	381,966	31,674	413,640
1882	150,421	363,835	25,536	389,371
1883	154,893	361,949	21,721	383,670
1884	144,086	286,393	1,863	288,256
1885	70,314	128,336	.....	.....

Exports.—Very little crude domestic graphite is exported This will not appear strange when it is considered that the domestic mines in 1883 provided only 575,000 pounds, while 17,348,016 pounds were imported. Statistics show for the ten years 1875 to 1884, inclusive, a total export of less than $20,000 worth. Figures of the export of manufactured domestic graphite are difficult of statement, from the fact that graphite forms a partial ingredient in so many kinds of goods. The custom-house records show, for instance, the following figures: Exports of manufactured graphite of domestic production for the fiscal year 1881, $1066; for 1882, $4834; while for most years no exports are specified. The records are obviously imperfect, as a single company in each of these years exported domestic graphite products of larger value. An approximate statement is the only thing possible; $25,000 per annum will cover the value of the graphite in articles manufactured from the domestic product, while $50,000 per annum will probably cover the value of the articles.

Manufactures.—The properties of graphite specially fit it for the following purposes: The manufacture of refractory articles, such as crucibles, retorts, dippers, stirrers, bricks, stoppers, nozzles, foundry facings, etc.; lubricating compounds, electrical supplies, stove polish, electrotyping "lead," pencil leads, and pigments. The table of relative proportions of different kinds of graphite used and the percentage consumed for each of the various purposes, given in the last report, must be changed

* From the *Mineral Resources of the United States for* 1884.

somewhat on account of the increased use of graphite as a lubricant and in the manufacture of foundry facings.

PROPORTIONATE AMOUNTS AND KINDS OF GRAPHITE USED FOR DIFFERENT PURPOSES.

MANUFACTURES.	Kinds of graphite used.	1883.	1884.
		Per cent.	Per cent.
Refractory articles, such as crucibles, retorts, stoppers, etc	Ceylon, American	35	30
Stove polish	Ceylon, American, German	32	30
Lubricating graphite	American, Ceylon	10	13
Foundry facings, washes, etc.	Ceylon, American, German	8	10
Graphited greases	American	6	8
Pencil leads	American, German	3	3
Graphited packing	Ceylon, American	3	3
Polishing gunpowder and shot	Ceylon, American	2	2
Paint	American	½	½
Electrotyping	American, Ceylon	¼	¼
Miscellaneous—piano action, photographers' and hatters' use, electrical supplies, etc		¼	¼
		100	100

The foregoing table shows quite an increase over the similar table of the former report in the percentage used for lubrication and manufacture of foundry facings and washes. These two lines deserve especial mention.

Graphite in Foundry Facings.—The last few years have witnessed a great improvement in American foundry practice. From the comparatively light, simple, and rough castings of the earlier days, the time has been reached when immense castings are of frequent occurrence, in which the work is often elaborate and the finish is very high; in fact, castings are now produced at will, light or heavy, smooth or rough, plain or ornate, of common, chilled, or malleable iron, steel, etc., and all of these different conditions require different service of the facings. Instead of the simple hard-wood charcoal-dust of earlier times, facings of charcoal, sea coal, anthracite, soapstone, and "black lead" or graphite are now used. In all cases where the work is severe, graphite is the constituent that gives the "body," the "sleeking" and "peeling" properties to the facing. The use of graphite for this purpose has increased rapidly with the demand for better and finer foundry work.

Graphite as a Lubricant.—With the introduction of heavier machinery, the service demanded of a lubricant has become more and more severe. For much of this work, it is found that oil will not answer at all, and for much more it answers only at great expense; hence the use of greases and the more solid lubricants, such as graphite, mica, soapstone, sulphur, etc. When graphite first began to be used as a lubricant, any thing that gave a stove-polish luster when rubbed was assumed to be "black lead" and fit for lubricating purposes. Experience soon proved it to give very varied results—sometimes very good and sometimes the reverse; in fact, it was not reliable because of a lack of uniform, correct sizing and purity, and soon fell into disrepute among practical men, though continuing to be well spoken of in the books. In 1868, however, systematic experiments were begun in this country with the view of producing a reliable lubricant from graphite, and the final result has been very satisfactory.

Water-dressed dry foliated American graphite is a little thin flake of graphite of extraordinary properties. Its superiority as a lubricant has been attested by all recent writers on friction. Its coefficient of friction is very low. Its enduring qualities are several times greater than those of any oil. Unlike either oil or grease, it is not affected by heat, cold, steam, acids, etc., and acts equally well under varying conditions of temperature and moisture.

Many and carefully conducted experiments in the laboratory with Professor Thurston's testing-machine, and experience in shops, have shown that for the highest usefulness the flake must be of a certain size and dressed perfectly pure. Graphite never occurs of the proper size and purity for use. Its natural impurities contain substances fatal to anti-friction purposes. Its proper selection, sizing, and perfecting for lubricating purposes is a matter requiring large skill, much machinery, and great experience. The difference between a perfectly pure graphite and one almost pure, but still totally unfit for lubricating, can not be detected by either sight or touch.

It is recommended dry for steam and air cylinders, mixed with grease for heavy bearings, and mixed with oil for light bearings. On being applied to a bearing, it readily coats the surfaces with a shiny, unctuous veneer. These surfaces then slide on each other with very little friction. On being applied to heated bearings, the graphite soon fills up any inequalities of the bearing surfaces due to cutting, abrasion, etc., making them smooth and even, after which the bearing soon cools down. It is equally useful for wood or metal surfaces; in short, in all cases where friction exists. If the bearings are loose enough for the introduction of this thin flake graphite, it will prevent heated bearings, cool those already heated, and reduce friction better than any thing else. In all cases where the service required of a lubricant is very severe, graphite will be found specially useful, as in mill steps, gears, heavy bearings, bed plates, etc.

TABLE OF TESTS.

LUBRICANT.	Quantity in milligrams.	Total pressure in pounds on bearing.	Temperature at the close, degrees F.	Average coefficient of friction.	Time in minutes till the bearing "squealed."	Total number of feet friction surface traveled.
Best sperm oil	335	180	240	·0555	11	7,198
Graphite mixed with enough water to distribute it over bearings	120	180	234	·0596	30	19,635
Graphite mixed with tallow	335	120	340	·0936	38	24,216

This is the most rapidly growing use of graphite. In 1884, a single company sold 250,000 pounds of it for this purpose, branded as "lubricating graphite," and probably as much more not so labeled, which was used for the same purpose.

A French engineer is said to have recently introduced a new refractory brick, made by agglomerating powdered graphite, for metallurgical purposes.

There are twenty-six American manufacturers of graphite products.

The German Steel Industry and the International Rail Convention.—*Kuhlows'* says the impending dissolution of this convention is sure to have a great influence on the steel industry, not only of this but of other countries. It is expected that prices will fall 20 marks per ton, so that foreign works would in future only get 75 marks. Adding to this the duty of 25 marks, we find that foreign steel would be able to compete in Germany at 100 marks. This makes it clear that the home industry will suffer a considerable fall of prices and therefore of profits.

Miners' Wages in Australia.—In New South Wales, coal miners obtain 10s. a day; pit laborers, etc., from 6s. to 6s. 8d. a day; carpenters and blacksmiths, from 9s. to 11s. a day of 8½ hours' work. After next June, the number of hours constituting a day's work in connection with the working of New South Wales collieries will be reduced to eight. Tin, copper, gold, silver, and some other classes of miners receive average daily wages of 8s. 4d. for shifts of eight hours. In cases that demand travel to remote and far distant mines, the wages are proportionately increased. Blacksmiths obtain from 10s. to 12s.; blacksmiths' strikers, 8s. 4d.; ordinary laborers, 8s.; engine-drivers, from 10s. to 11s.; firemen, from 8s. 4d. to 9s. 2d.; smelters, from 10s. to 10s. 6d.

Diamagnetism of Quartz Crystal.—Hitherto no substance among those that exhibit diamagnetic properties has been observed to possess any permanent diamagnetic polarity analogous to the permanent paramagnetic polarity of hard steel. The property of retention of diamagnetization is, however, found by Dr. O. Tumlirz, of Prague, to be possessed by rock crystal. Both those specimens that show right handed and left-handed optical properties are alike in this respect, and the axis of diamagnetization appears to be independent of the crystallographic axis, and dependent only on the axis of initial magnetization. Dr. Tumlirz, whose investigation is published in *Wiedemann's Annalen*, appears to think that these facts negative Becquerel's theory of diamagnetism.

The German Potash Market.—The annual meeting of the chloride of potash manufacturers was held at Stassfurt recently. The president, says *Kuhlow's*, informed the meeting that last year the chloride of potash business took a slow but steady turn for the better, and the prospects for this year are extremely hopeful. The output was in both January and February of this year 30,000 centners more than in the same months of 1885, and in the first half of March 20,000 centners more, although, on account of the ice in the river, the shipments had not been larger. He held it desirable to increase the output of carnallit 10,000 centners a day, because of the large contracts already concluded and the favorable prospects for consumption. Such an increase would be justifiable, even if the consumption did not increase in a greater degree than it had already; but it was the general opinion that the sale would materially increase on the reopening of navigation. Whether an increase of 5000 centners a day should take place at once, and another similar increase at a later date, was a matter for the decision of the syndicate. It was stated that the contracts of the French government in chloride of potash would be issued in a few days. Herr Mook gave a report on the results of his visit to America. This report was satisfactory beyond expectations, not only in regard to the large orders that have of late come from America, but also to the prospects of a growing consumption in that country. The American government took a lively interest in kali manuring, which was eminently suitable for tobacco, sugar-cane, and other plantations, and was also a necessity in North America, just as in Europe, as a substitute for animal manures in agriculture. The consumption of kainit decreased last year in America; but the highest percentage chloride of potash was used in a greater measure, as it works more effectively, while the freightage of both chemicals is the same.

PATENTS GRANTED BY THE UNITED STATES PATENT-OFFICE.

The following is a list of the patents relating to mining, metallurgy, and kindred subjects, issued by the United States Patent-Office.

GRANTED MARCH 30TH, 1886.

339,001. Kiln for Bricks, Lime, Pottery, etc. William H. Melcher, Philadelphia, Pa.
339,021. Drill-Shaft Grapple. William Seely, Port Hope, Mich.
339,036. Pipe-Coupling. Alfred Wilbur, Alleghany City, Pa.
339,067. Process of Reducing Ores of Nickel and Cobalt with Oxide of Manganese. Fritz Lotter, Altena, Westphalia, Prussia, Germany.
339,090. Machine for Breaking Submerged Rock. Henry C. Finch, Oil City, Pa.
339,103. Rock-Drill Machine. Silvanus Hussey, Buffalo, New York.
339,118. Method of Reducing Old Railroad Rails to Plates. Edgar B. Stocking, Washington, D. C.

GRANTED APRIL 6TH.

339,143. Steam-Boiler Furnace. James Cannan, Elgin, Ill.
339,177. Natural Gas Carburetor. William Herlehy, James O. McGinnis, and Frank McGinnis, Pittsburg, Pa.
339,225. Gas-Engine. Clark Sintz, Springfield, Ohio.
339,285. Method of Making Tin-Plate Sheets. William Garrett, Pittsburg, Pa.
339,296. Forming Artificial Stone or Concrete Arches. Peter H. Jackson, San Francisco, Cal.
339,311. Bagasse Furnace. Ramon Marsá, Salobreña, Spain.
339,360. Basic Lining for Open-Hearth Steel and Iron Furnaces. William F. Batho, Westminster, County of Middlesex, England.
339,402. Apparatus for Producing Cast-Metal Pipe. David Giles, Chattanooga, Tenn.
339,409. Process of and Apparatus for Producing Gas for Lighting and Heating Purposes. Felix Hembert and Edmond Henry, Paris, France.
339,415. Gas-Pressure Governor. Thomas C. Hopper, Philadelphia, Pa.
339,471. Process of and Apparatus for Manufacturing Gas. Henry C. Rew, Chicago, Ill.
339,472. Process of and Apparatus for Manufacturing Gas. Henry C. Rew, Chicago, Ill.
339,492. Art of Making Steel Eye-Bars. Robert W. Smith, Toledo, Ohio.
339,545. Process of Refining Petroleum. James B. Grant, New York, and Allan Mason, Brooklyn, New York.
339,546. Apparatus for Refining Oil. James B. Grant, New York, and Allan Mason, Brooklyn, New York.
339,552. Apparatus for Concentrating Acids. John Hughes, Stapleton, New York.
339,598. Preventing Boiler Explosions. Winslow Titcomb, Waterville, Me.

FURNACE, MILL, AND FACTORY.

The Wiswell Electric Mining Machinery Company, of Boston, Mass., has recently shipped a number of its mills to the Western States, to Nova Scotia, and to Honduras. The reports from the mills in operation in different sections are very satisfactory as to the results obtained.

Selden's patent packings, manufactured by Mr. Randolph Brandt, of this city, are meeting with great favor for use on mining pumps and engines. The sales were larger during March than in any month since the goods have been on the market.

The Ingersoll Rock Drill Company, of this city, has recently received important orders ; among the latest, a complete plant of Ingersoll machinery, consisting of "Eclipse" drills, "Straight-line" air-compressors, boilers, etc., to be used by Messrs. W. A. Douglass & Co., of this city, who secured the contract for twenty-five miles of the work recently let on the Colorado Midland Railroad. The section lies just west of Leadville, and includes a 2200-foot tunnel 16 by 18 feet, at an elevation of 11,000 feet ; also, two smaller tunnels. The machinery is now on the way to Colorado. A plant of the company's machinery is setting up for driving the Cascade tunnel for the Northern Pacific Railroad in Washington Territory. The tunnel will be 10,000 feet long, and will be driven from both ends simultaneously. Ingersoll drills will be used in the headings and on the benches, and the work will be lighted throughout by electricity. The progress of this work will be watched with interest, as some fast driving is expected.

The Pacific Iron-Works, of San Francisco, Cal., report a considerable demand for mining machinery. The works have recently shipped a ten-stamp gold mill for Tehuantepec, Mexico, a 20-ton roller mill for Querobabi, Sonora, Mexico, a 30-ton smelting plant, including revolving drier, for El Trinidad Company, Sonora, Mexico, revolving driers for the Ventanos Company, Durango, Mexico, and Duncan concentrators to several points on the Pacific coast.

The Ætna Iron-Works, of Quincy, Ill., has changed its name to the Ætna Iron and Steel-Works, and increased the capital stock from $60,000 to $120,000.

The annual meeting of the Western Nail Association, was held in Wheeling, West Va., on the 14th inst. No change was made in the selling card of nails.

The Trenton Iron Company, of Trenton, New Jersey, has issued a handsomely illustrated wire-rope catalogue, with price-lists of the different articles relating to wire rope and wire rope transmission manufactured by the company. This company has recently entered the field as a wire rope manufacturer, and no doubt its goods in this line will deserve the high reputation the company's rolled beams and other products have long enjoyed. The catalogue gives a large amount of useful information.

The Billings & Spencer Company, of Hartford, Conn., is successfully producing drop forgings of pure copper for electrical purposes, and has taken an order from the Edison Machine-Works, of this city, for a quantity of such goods. These forgings take the place of a combination casting that had to be soldered together, making a much better quality at lower rates.

Mr. A. J. Wright, of Wright, Berger & Co., of Cleveland, Ohio, has succeeded in making a solderless copper float, a thing long regarded as impossible. This invention promises to revive the use of automatic steam arrangements of various kinds that have fallen into disrepute on account of the unreliability of ordinary floats. Besides being solderless, it is also said to possess, in a degree not heretofore attained, another essential element—strength, a 2¾ by 4½-inch float, such as is used in the Reliance alarm gauges, standing long-continued tests of 200 pounds steam pressure without either collapsing or filling with water.

Messrs. Gordon, Strobel & Laureau, of Philadelphia, Pa., have completed a furnace at Steubenville, Ohio, that shows the remarkable record of 90 tons of iron a day on less than 2000 pounds of fuel, a saving, they claim, of from 600 to 800 pounds to each ton of iron produced. They are erecting a number of furnaces for other firms that have inspected the works of the Steubenville plant.

The first Bessemer steel ever made at Chattanooga, Tenn., was made on the 10th inst., at the Tredegar Iron-Works. The material used is Cranberry ore, obtained from Roane Mountain. The test has been anticipated with much interest, and was carefully watched by a large number of iron-men. It proved very satisfactory, and should further tests demonstrate still further the adaptability of Southern ore for steel-making, it is probable that the Roane Iron-Works, of Chattanooga, now idle for three years, will engage in the manufacture.

The Ewald Iron Company, of St. Louis, Mo., owner and operator of the Tennessee Rolling-Works, has purchased the Louisville Rolling-Mill, Louisville, Ky., and is making repairs preparatory to putting the entire plant in operation. The mill has been idle for two years. The Ewald Iron Company will run it in connection with its other works.

The National Tube-Works, of Middletown, Pa., will erect works at Youngstown, Ohio. The erection of the necessary buildings will soon begin. At first, but one furnace will be started. The works, when completed, will be twice as large as the works at Middletown, and have a capacity of 180 tons a day.

The Paxon Lead and Zinc Manufacturing Company, of Pottstown, Pa., which has a capital of $60,000, has been granted a charter.

Westphalian iron-works have secured a portion of a contract for 27,800 tons of heavy Bessemer steel rails for the Mediterranean Railroad. German and French prices varied between 118 and 123 lire a ton at Genoa, duty not included. Italian works quoted higher prices.

The Chapman Valve Company, of Boston, Mass., has furnished the valves and hydrants for the new water-works at East St. Louis.

PROPOSALS.

The Lighthouse Inspector, Third District, Tompkinsville, New York, will receive proposals until May 10th, for fuel for vessels and stations in this district, for the fiscal year ending June 30th, 1887.

The Board of Water Commissioners, of Little Falls, New York, will receive proposals until May 6th for constructing conduit, dam, inlet-chamber ; distribution reservoir, and about one mile of open canals ; excavating and refilling trenches and laying the system of distribution complete ; and the valves and hydrants required for the system complete.

The Supervising Architect, Treasury Department, Washington, D. C., will receive proposals until April 30th for furnishing and putting in place, complete, the iron main and court roof framing, etc , of the post-office and court-house building, at Baltimore, Md.

D. W. Flagler, Lieut.-Colonel Commanding, Rock Island Arsenal, Ill., will receive proposals until April 28th for about 4000 pounds of tool steel, large sizes, plating materials, two machinists' tool-grinders, and three machines for sheet metals.

LABOR AND WAGES.

Operators representing nine tenths of the entire production of the Clearfield District have issued the following circular, which is distributed among all the idle workmen in the district : "Believing that you have been misinformed and misled by outside parties as to the real condition of affairs in the competing steam coal producing districts, we take this means of giving you the facts. The Pocahontas and Chesapeake & Ohio districts of Virginia produce a steam coal of good quality, and as these properties are operated in the interests of the railroad companies, their development has been rapid and the tonnage increasing constantly, and the coals sold at very low prices. These coals are shipped at Newport News and Norfolk, and from there reach every seaboard city in direct competition with our own productions. During the first three months of the present year, the output from the Pocahontas and Chesapeake & Ohio regions has been 417,205 tons as against 328,267 tons for the same period of last year, showing an increase since the first of the year of 88,998 tons ; the greater portion of said increase having been made since the suspension of work in the Clearfield region.

"The miners and employés there have been at work regularly and without intermission at the old wages, which has enabled Pocahontas and New River shippers to take many large contracts for this year's delivery at even less than last season's prices, which were formerly supplied from the Clearfield region. We have also to meet the competition of the small sizes of anthracite coals, which are sold at extremely low prices, and have been largely substituted for your coals, and every effort will be made by the anthracite companies to continue it. These facts, which need no proof, should convince you of the impossibility of increasing wages in the Clearfield region at this time. It is a self-evident fact that, unless your coals can be placed in the competing markets at as low prices as those from other regions, sales of course can not be made. We are always ready and willing to pay the highest wages that the selling price of coal will permit, and to rectify any just grievances brought to our notice by our own employés. That a few operators have agreed to pay an advance in wages to their men has no bearing on the question. They paid it not to benefit their employés, but to enable them to speculate for their profit while you were idle."

These statements are beyond dispute, and as a very large number of miners are anxious to get to work, it would not be surprising if the circular appealed to their common sense, and an early resumption took place.

At Connellsville, the advance demanded by McClure & Co.'s workmen has been granted, and all have returned to work. Every mine in the coke region in Pennsylvania is now paying the increase.

The coal miners of Pittsburg District, Pa., who were recently granted an advance from 2½ to 2¾ cents a bushel for mining, have voluntarily notified their employers that they will not accept the increase until May 1st, when a general demand for the 2¾ rates will be made.

The Annual Convention of the Amalgamated Iron and Steel Workers will be held on June 1st, at Pittsburg, Pa. No definite action has yet been taken in reference to the scale to be presented, but it is generally thought that the wages will be advanced 10 per cent.

The puddlers and laborers of the Pottsville Iron and Steel Company, at Pottsville, Pa., struck during the week for an advance in wages. The puddlers demand $3.65 a ton, an advance of 40 cents, and the laborers $7 a week, an advance of $1. The company offered the puddlers $3.50, but it was refused. The strike will entirely suspend operations at the mills.

At Collinsville, Ill., the miners of that district met this week, together with the employés of the zinc-works and the pressed brick works, and favored a thorough organization. Nothing was done pointing in the direction of a strike.

The employés of the Kittanning Iron Company's Rebecca Furnace, Kittanning, Pa., have struck for an advance of 10 per cent.

TRANSPORTATION NOTES.

The Philipsburg & Drummond Railroad Company has been incorporated in Montana, with a capital stock of $500,000, to build and operate a line of railroad from Philipsburg to Drummond, Mont. The road will pass through a rich mineral country.

The arrangements that have been so long in negotiation between the imperial government and the Canadian Pacific Railroad for a line of steamers plying between British Columbia, Hong Kong, and Australia have been completed. The English government will pay a subsidy of £100,000 sterling annually for ten years.

It is rumored that the Pennsylvania Railroad Company has given instructions to complete the survey at once between Curwensville and Mahaffey's. If this road should be built, it will open up another line of trade to the Pennsylvania, and, with the Houtzdale branch, will almost circumscribe the district drained by the Vanderbilt system in Clearfield County, Pa.

COAL TRADE NOTES.

The Maryland Coal Company has removed to No. 35 Broadway, New York City.

CALIFORNIA.

Mr. Jenkins Richards, at Livermore, Alameda County, has struck the coal vein in his long tunnel, 300 feet from the surface. Lateral drifts will be run to open up a stope, and begin taking out coal some time in May. The vein struck is nearly five feet in width ; and the coal is about the best in the district.

ILLINOIS.

The citizens of Maroa have formed a stock company, and begun boring for coal. Nearly two thousand dollars in cash have been raised for the purpose.

INDIANA.

The prospects of the Brazil District are not, it is said, very bright. The early completion of the Chicago & Indiana coal road, it is thought, will improve matters by placing the coal in markets farther northwest than Chicago. The new yearly scale of prices will come into effect May 1st. The scale was arranged through arbitration.

KENTUCKY.

The Miners' Co-operative Mining Company, which has recently been formed, has bought 600 acres of coal land near Morton's Gap, which it will soon begin to develop.

OHIO.

It is said that the new Pittsburg mine at Buchtel, lately operated by Johnson Brothers & Patterson, will be started up with a co-operative company of about 50 miners. The mine was closed down some time ago, owing to differences between the men and the company.

PENNSYLVANIA.

ANTHRACITE.

The breaker at Hooker colliery, at St. Clair, near Pottsville, operated by Capt. Thomas Wren, suddenly collapsed on the 15th inst., and fell in a mass of ruins. No casualties to life or limb resulted, but the breaker is a total loss. The catastrophe is attributed to the accumulation of an extraordinary quantity of prepared coal in the pockets awaiting shipment.

BITUMINOUS.

On the 19th inst., the seam of coal underneath the river-bed was reached, after about a year's work, by W. H. Brown's Sons, at their shaft at Saltsburg, at a depth of about 450 feet. The shaft has been continued into the coal-seam, which shows a coal hard and bituminous, similar in appearance to the Connellsville coking coal. That which has been dug has been made into coke. The firm contemplates the erection of a large coke plant if the coal all proves of the same quality, as it is better adapted for coking than for any other purpose.

WEST VIRGINIA.

The Fire Creek Coal and Coke Company, Fire Creek, will build 34 additional coke-ovens.

William Wyant, of Eagle, will build 30 new coke-ovens.

GAS AND OIL NOTES.

Exports of refined, crude, and naphtha from the following ports, from January 1st to April 10th :

	1886. Gallons.	1885. Gallons.
From Boston	1,262,283	1,593,682
Philadelphia	31,218,718	22,427,657
Baltimore	2,914,987	2,634,814
Perth Amboy	718,086	
New York	100,290,084	92,401,953
Total exports	136,404,158	119,058,106

A dispatch from Vienna states that the treaty between Austria and Hungary raises the duty on light American raw petroleum and benzine and other petroleum products, and the prohibitive import duty on Russian heavy petroleum.

The Chief of the Bureau of Statistics reports the total values of the exports of mineral oils from the United States for the month of March, 1886, and during the eight months ended March 31st, 1886, as compared with similar exports during the corresponding periods of the preceding year, as follows: March, 1886, $3,824,394; March, 1885, $3,554,706; nine months ended March 31st, 1886, $37,549,523; nine months ended March 31st, 1885, $37,224,715.

GERMANY.

PROVINCE OF HANOVER.

Three years ago, a petroleum company was formed in Hamburg for the purpose of carrying on extensive borings in Hanover, and, of course, of making a large fortune. Since the company came into life, little or nothing has been heard of it until just lately the announcement has been published that a meeting of shareholders will be held, in order, not to divide the fortune, but to consider the question of liquidation.

NEW YORK.

Mayor Becker, of Buffalo, has signed the natural gas grant, providing for a renewal of the company's bonds and fixing the limit of charges at 75 cents per 1000 cubic feet. Its grant permits the city to purchase the plant at a valuation at the end of twenty years.

OHIO.

The Ohio Gas Fuel Company, of Youngstown, is ready to make contracts to furnish natural gas by August 1st.

PENNSYLVANIA.

The Fire Marshal at Pittsburg, at the instance of the Board of Underwriters, has issued a new card of directions to gas-fitters, relating to houses where natural gas is used. They provide that all pipes should be tested by the inspector with a mercury column; the pipes under stoves or grates shall be copper; when the mercury drops, a test for a leak by ether or with soap shall be made; no fire test shall be made. The fitters are recommended not to run pipes between floors or walls when any other way is open; plenty of air under grates is advised; all fitters must, in fitting up a house, report to the gas company how many fires have been fitted up.

The Philadelphia Company is leasing land in Indiana County, between Black Lick Creek and the Conemaugh River. The company has about 15,000 acres there. It intends to develop the land this spring.

Messrs. Mansfield, of Fayette City, have leased 1000 acres of land in Perry township, and are preparing to drill deeper some of the wells started there twenty years ago.

A charter has been granted to the Torrens Gas Company, of Pittsburg, to furnish natural gas to cities and towns in Alleghany, Indiana, Cambria, and Westmoreland counties.

This week, a series of experiments have been made with natural gas in the puddling and heating-furnaces of the Beaver Falls Iron Company, which, it is claimed by those who have been conducting the experiments, were extremely satisfactory; the capacity of the furnace being greatly increased as compared with the work done when coke was used.

GENERAL MINING NEWS.

ARIZONA.

GILA COUNTY.

OLD DOMINION.—Mr. Saley Raunheim and his associates have gained their suit against this copper company at Globe. The action was brought for $25,000 damages, and during a number of years has been pending in the courts of New York, Baltimore, and Globe, until now the costs it is said alone foot up fully $20,000.

PIMA COUNTY.

TOTAL WRECK.—Propositions to reorganize the company and to raise funds for the future working of the mine were discussed at the annual meeting, held in this city on the 13th inst. The late developments made are good and favorable for the resumption of work.

YAVAPAI COUNTY.

ST. LOUIS-YAVAPAI MILL AND MINING COMPANY.—The company has purchased the Tip Top mill, which will be moved to the dump where it is said there are 20,000 tons of ore ready to work.

ASIA.

An interesting description of the New California, as the gold mines discovered in the valley of the Djolgute River are called, is given in a letter to the *Journal des Débats*. This valley is upon the Chinese bank of the Amoor, directly opposite the Russian colony of Ignachino. Gold was first discovered in May, 1884, and soon attracted many adventurers, most of them being Russian deserters, escaped convicts from Siberia. The number of these in January last year was 9000, which has since been very materially increased; also, about 6000 Chinese, and some 150 of other nationalities. The gold-finders are divided into 722 small groups of workmen, who are absolutely equal. These elect twelve elders, who do not work themselves, but receive about $150 a month salary, and superintend the diggings. The colony does not meet with any interference from the Chinese authorities, the laws of which are very simple and severe, the penalty of death being inflicted for cheating at play, for adulteration of gold-dust, or for theft, while flogging is inflicted for drunkenness during hours of labor, or bringing females into the colony. The gold-fields are twenty-five miles in length and three broad, and are said to be very rich, seven pounds of gold being obtained from 32 cwt. of gravel, even with the primitive methods of washing in vogue.

CALIFORNIA.

We are indebted to Mr. J. B. Randol, of San Francisco, for the following statement of the production of quicksilver in California for the first quarter of 1886 :

Mines.	1886. January. Flasks.	February. Flasks.	March. Flasks.
Ætna	162	132	209
Napa Consolidated	147	192	218
Great Western	339	274	226
New Idria	70	175	20
Sulphur Bank	100	108	91
Redington	42	24	21
Great Eastern	73	53	43
Various	34	45	75
New Almaden	1,431	1,100	1,522
Total	2,398	2,103	2,425

SEMINOLE GOLD MINING COMPANY, LIMITED.—This company has been organized in London, to carry on the general business of miners, smelters, and reducers of ores, minerals, etc. Capital, £12,000, divided into 12,000 shares of £1 each. The directors are John Hamblyn Burnell, San Francisco, and Frederick B. Burnell, W. Ford, Albert A. Ellis, A. Kislinbury, W. Eckstein, and F. Dunn, of London.

MONO COUNTY—BODIE DISTRICT.

BODIE.—The men have begun to cut out for a winze on the 700 in the Fortuna vein, and are extracting ore from the fourth incline level.

MONO.—It is reported that operations at the distant mill, now rented by the company, will be suspended on account of the cost of hauling the ore, etc., and that, should developments warrant, a small mill will be erected at the mine by the company.

STANDARD.—During the week ended the 3d inst., 303 tons of ore were produced.

CANADA.

PROVINCE OF ONTARIO.

BEAVER.—The steam drills, air-compressors, and miscellaneous machinery have been successfully landed at the mine, and the work of erection begun. The lower tunnel has penetrated Silver Mountain 464 feet, and the upper tunnel has been driven clear through the mountain, on the south side of which an air-sinking shaft is to connect with the lower drift. It is already down about 40 feet, and, when sunk about 100 feet deeper, the connection will be made that will give perfect ventilation in all parts of the mine and render it possible to handle with great ease and at a cheap cost the ore from every part of the mine.

PROVINCE OF QUEBEC.

CANADIAN COPPER AND SULPHUR COMPANY, LIMITED.—After protracted negotiations, an agreement has been concluded with the Montreal Chemical Fertilizer Works, Limited, for the purchase of the property of the Canadian Copper and Sulphur Company, Limited. The privilege of each shareholder in the Canadian Copper and Sulphur Company is the right to subscribe to an allottment at par of one £1 preferred share in right of every four shares held by him in the Canadian Copper and Sulphur Company, and for every preferred share so subscribed to receive one £1 deferred share, which will be registered in his name free of charge as fully paid up. The majority of the debenture-holders have agreed to convert their debentures into preference shares of the new company.

COLORADO.

ARAPAHOE COUNTY.

HOLDEN SMELTING COMPANY.—The company has purchased thirty acres of ground for the erection of the new smelter, and the grading has begun. A number of contracts have been let. The works are on the line of the old Colorado Central Railroad, across the river, and opposite Grant's Works.

CLEAR CREEK COUNTY.

COLORADO CENTRAL.—The output for March, officially reported, was 93 tons, which sold for $20,532.80. The falling off in the production was caused by putting many of the men to work to help erect the new machinery now getting into position.

FREELAND.—Official advices show the production for March to have been: Gold valued at $23,036.44; silver, at $4998.09; and copper, at $79.93; making a total of $28,114.46.

KOHINOOR & DONALDSON.—It is reported that Messrs. Matthews & Webb, of Denver, have taken a lease on the Donaldson mine, one of the principal properties of this company.

PELICAN & DIVES.—At the annual meeting, it wa

decided to put in a set of rolls at the mine to crush the ore.

PLUTUS.—The production for March, as officially reported, was: Gold valued at $7345.02; silver, at $6709.81; and copper, at $723.01; making a total of $14,777.84.

GUNNISON COUNTY.

Reports from Crystal and Rock Creek state that a tunnel to cut the Mammoth vein on Sheep Mountain, Rock Creek, will begin close to camp, and will be of great benefit to the country if properly carried out. The tunnel will begin at a point where a depth of 3000 feet can be gained in less than that distance. Work will be started upon the Lady Elgin, which shows a good body of lead carbonate ore. The vein cuts through Sheep Mountain and gives great promise. The large bodies of marble at Crystal are in hands that will open up an important industry for Colorado as soon as better facilities are afforded to get it to market, and the Midland Railroad building will insure means whereby the marble can be shipped to any part of the country.

LAKE COUNTY.

The Leadville *Herald* reports the following:

AMERICAN SMELTING COMPANY.—It is said to be decided that this company will build a large new plant at old Colorado City, between Colorado Springs and Manitou. After wavering a long time between Denver and Pueblo, the decision was forced by the leading men in what is called the Midland Railroad, which is to be built from Colorado Springs through Ute Pass to Aspen.

DENVER CITY.—The output during the past month has been fair, and the company has made a small profit.

FOREPAUGH.—The hoisting of ore has begun.

SMALL HOPES.—The new shaft on the Result lode of this property is reported to have disclosed fifty to sixty ounce ore.

OURAY COUNTY.

YANKEE GIRL.—The new hoisting plant, furnished by Messrs. Fraser & Chalmers, of Chicago, has been put in operation. The monthly output ranges from 150 to 250 tons. Owing to the large increase of water in the shaft, a Knowles complex condensing duplex pump has been contracted for, and is now on the ground to be placed on No. 6 station. This pump will have a lift of 400 feet to the adit level.

PITKIN COUNTY.

INGERSOLL VS. HARRISBURG.—In the case of the Ingersoll mine, which recently applied for an injunction on the Harrisburg to stop the work until a final hearing, the Harrisburg bringing a cross-bill to enjoin the Ingersoll from working on the vein, a decision has been rendered by Judge Hallett to the effect that the Ingersoll account for all ores extracted north of a line parallel to and 500 feet from south end-line of Ingersoll, and the Harrisburg not to work over its west side-line, and to account for any ores extracted from a strip covered by both claims the title of which is in dispute, but to be allowed to mine and extract all ores within its boundary lines.

SAN JUAN COUNTY.

MASTODON MINING AND MILLING COMPANY.—This company has been incorporated at Cleveland, Ohio, by Charles A. Brayton, W. S. Chamberlain, John T. Wamelink, George A. Bemis, J. F. Black, John Whitelaw, and M. E. Rawson. It is located near Animas Forks.

SUMMIT COUNTY.

CAP-SHEAF GOLD AND SILVER MINING COMPANY.—This company, with a capital stock of $1,000,000, $10 a share, non-assessable, has been formed to carry on operations in this county.

QUEEN OF THE WEST.—It is reported that this mine has been purchased by St. Louis parties for $150,000. The present developments consist of shafts, tunnels, and drifts, amounting to over 6000 feet; and tunnels, and drifts amounting to 4000 feet. One thousand feet of stoping have been done between the different levels. The ore is soft sulphurets combined with silicates. The treatment has been furnished at Leadville by the smelting process. The ore has averaged so far $70 a ton, and the expense of mining has not been above the general average.

DAKOTA.

LAWRENCE COUNTY.

CALEDONIA.—The official report, dated April 5th, shows that the winze advanced 4½ feet, making a total depth of 80⅓ feet. The south drift advanced 6⅓ feet, making a total of 97 feet. Ore produced from 425-foot level, 854 tons; cave, 416 tons; total, 1270 tons The net bullion production for March was $19,735.29.

ENDYMION.—The company has let a contract to sink a shaft 100 feet on its property at Carbonate Camp. Seven thousand shares were lately sold at ten cents a share.

FATHER DE SMET.—During March, the net bullion production was $26,022.99.

IRON HILL.—The stock is gradually advancing, and the latest reports state that sales were made at $4, and a few at $4.20.

PENNINGTON COUNTY.

HARNEY PEAK TIN MINING AND REDUCTION COMPANY.—This company, which has recently started up its machinery, reports that every thing is running satisfactorily. The five Golden Gate concentrators are in operation, giving good results.

KENTUCKY.

GIPSY QUEEN.—This company has been incorporated at Louisville, to do a general mining and milling business, with a capital stock of $1,000,000.

MASSACHUSETTS.

MIDDLESEX COUNTY.

WILMINGTON GRANITE COMPANY.—This company has been organized at Boston with a capital stock of $50,000. Work will soon begin. The quarry to be worked is located at Wilmington, about fifteen miles from Boston, with every facility for transportation north and south.

MEXICO.

An English company has recently purchased the Alta and Baja-California mines at Pachuca.

It is stated that C. S. Benham, Superintendent of the Copper Queen Mining Company, at Canancas, Sonora, was shot dead at Hermosillo on the 6th inst. by his coachman.

ROSARIO VIEJO.—At this mine, Pachuca, the main shaft has been sunk nearly two hundred varas, and the shareholders propose continuing it for some fifty more, after having worked and reduced the metal already discovered.

SANTA GERTRUDIS.—This company at Pachuca has undertaken to put its mine in connection with the La Blanca mine.

MICHIGAN.

COPPER MINES.

The following statement shows the production of the following mines for the time mentioned:

NAME OF MINE.	March, '86. Tons.	March, '85. Tons.	1886. Tons.
Calumet & Hecla.....	2,602	2,399	7,334
Quincy..	230	210	626
Franklin.....	201	185	609
Atlantic...	187	194	575
Huron.....	120	119	368
Tamarack (estimated)	220	.....	594
Osceola "	172	.. ...	472

IROQUOIS COPPER COMPANY.—This company has been organized with a capital stock of $1,250,000, 50,000 shares, to own and operate 560 acres of mining property just north of the Kearsarge, heretofore owned by the St. Mary's Canal Mineral Land Company, which sold the land for 20,000 shares of Iroquois stock, with $5 credited as paid upon each share. It is the plan of the company to conduct explorations to develop the property the coming summer. It is known that the Kearsarge lode runs across the property, and this bed where opened on the Kearsarge Company's land gave signs of good promise. A railroad connection with a stamp mill, of which two heads could be hired, can be made this season, so that in case the openings should show profitable ground, the rock could be easily handled, and be put into refined copper and sent to New York for sale by next winter.

KEARSARGE.—A meeting of the directors was held in Boston last week. The company, which is an old organization, owns a mine north of the Tamarack on the range, and in which the Tamarack and Osceola people hold a controlling interest. The mine has never been more than explored, and at the meeting steps were taken immediately to develop the property. For this purpose, an assessment of $5 a share ($100,000) was ordered, payable May 1st. The board of directors as now constituted consists of Messrs. Charles Van Brunt, Joseph W. Clark, Horatio Bigelow, Henry Sayles, and R. R. Goodell. Mr. A. S. Bigelow is secretary and treasurer. The work of exploration will be under the general supervision of Captain Daniel, of the Tamarack mine. The plan of development contemplates the sinking of two shafts and driving an adit level for drainage, ventilation, etc., and connecting the mine immediately by the Hancock & Calumet Railroad with the Osceola's stamp mill on Torch Lake, where two heads of stamps can be hired. The Tamarack, which is now using these two stamps, is building its own mill on Torch Lake, and will be ready to retire by the time the Kearsarge needs them. It will be readily seen that the new company, in view of these facilities, will be enabled to place its copper in New York at a very early day.

PENINSULA.—Operations will be resumed soon. Two shafts will be sunk and several levels run, in order to prove up the mine, after which it will be decided what further action will be taken. A tract of land embracing some 480 acres will be sold to provide means for the carrying on of the work.

ST. MARY'S CANAL MINERAL LAND COMPANY.—This company has sold to the Iroquois Copper Company about 560 acres of mining land, in consideration of 20,000 shares of the Iroquois Copper Company stock, par value $25, with $5 a share credited on the stock, and the further consideration that 20,000 shares shall be offered to the stockholders of this company until June 1st, 1886.

MONTANA.

LEWIS & CLARKE COUNTY.

Messrs. T. F. Chapman and M. Thompson, of Kingston, N. M., and W. S. Chapman, of San Francisco, have purchased a three-quarter interest in the entire Marysville properties, owned by Philip Shenon. The company guarantees to expend $100,000 in improvements by the erection of a mill, tramways, etc., within the next four months.

MONTANA COMPANY, LIMITED.—The production for March is reported to have amounted to $145,000.

SILVER BOW COUNTY.

MONTANA COPPER COMPANY VS. LIQUIDATOR MINING COMPANY.—The Montana has, it is reported, sued the Liquidator for $400,000 damages and costs of suit. The defendant is accused of running into the ground of plaintiff and extracting 35,000 tons of copper ore.

NEVADA.

ESMERALDA COUNTY.

Mr. A. C. Hamilton has acquired the title to the Old Chief of the Hill ground at Candelaria, by sales under judgments. The claim is located near the Northern Belle. The Carson *Appeal* says he has begun suit in the United States Circuit Court of Nevada against the Southern Nevada Gold and Silver Mining Company to quiet title to the property. This doubtless puts an end to the suit of the Southern Nevada against the Holmes Mining Company.

EUREKA COUNTY.

ALBION-RICHMOND SUIT.—The attorneys have stipulated that the hearing for a change of venue shall not be set before April 15th.

PAUL PRY.—This company has begun an action in the District Court at Eureka against James Haynes, to recover the possession of a portion of ground along the joining line of the Paul Pry and Marguerita mines. Damages to the extent of $3000 are also claimed, and an injunction has been granted restraining the defendant and his employés from working upon the disputed ground.

HUMBOLDT COUNTY.

AUBURN CONSOLIDATED GOLD MINING COMPANY.—A bill has been filed in the Superior Court at Chicago, Ill., by the trustees for the bondholders of this company, seeking instructions from the court as to whether they could sell the property of the company. The company owns claims, quartz mills, etc., in Humboldt County. It expended $200,000 in the lodes and machinery, and then was obliged to give a mortgage to secure an issue of bonds to cover an indebtedness of $56,300. The bonds fell due February 13th, 1884, when, to avoid foreclosure, the complainants were appointed trustees for the bondholders. The property has been sold for taxes, and $1054 is necessary to redeem.

STOREY COUNTY—COMSTOCK LODE.

From the Virginia City *Chronicle*, we take the following:

The pay-rolls of the Comstock mines for March aggregate $160,963.

BRUNSWICK MILL.—The results obtained by the Golden Gate concentrator at this mill, as mentioned in our issue of February 6th, have continued to be so satisfactory that five additional machines were ordered, but four were found sufficient to do the work of the 56 stamps, and they are now set up and in operation. The ore concentrates about 30 tons into one, and the work of the amalgamating-pans is reduced to $\frac{1}{30}$ part of the former work. The saving of metal is largely in excess of that made by the amalgamating process. It is probable that the concentrates will be smelted instead of amalgamated. The introduction of this machinery makes a new departure in the treatment of Comstock ores, and other mills on the lode are reported to be considering its adoption.

COMSTOCK MILL AND MINING COMPANY.—This company has been incorporated with a capital stock of $250,000. Senator John P. Jones, John W. Mackay, and other leading mining men are leading members of the company. The recent transfer of the Eureka mill, Carson River, was made in order to perfect the arrangements of the new company.

CONSOLIDATED CALIFORNIA & VIRGINIA.—During the week ended the 3d inst., there were shipped to the Morgan mill 1044 tons of ore and 1681 tons to the Eureka mill. The average value of ore milled during the same period, according to assays from battery samples, was $15.46 a ton for that crushed at the Morgan mill, and $17.32 for that crushed at the Eureka mill. During the week, bullion valued at $36,734 49 was shipped to San Francisco.

NORTH CAROLINA.

The Charlotte Assay-Office shipped something over $32,000 worth of bullion during February and March of this year. This shows an increase on former shipments for the same period.

UTAH.

BEAVER COUNTY.

STAR.—The company's mill at Milford started up on the 6th inst.

VIRGINIA.

ROANOKE COUNTY.

It is stated that arrangements have been made with capitalists in Ohio for the operation and development of the zinc mines on the farm of William M. Martin, about three miles from Roanoke. These mines are said to be very rich. An assay of the ore shows it to be 57 per cent zinc, and yields $24 of silver to the ton and $4.20 of gold. The mines are located on the Rorer narrow-gauge road.

BULLION PRODUCTION FOR 1886—SPECIAL OFFICIAL REPORTS.

MINES.	States.	Month of March.	Year from Jan. 1st, 1886.
		$	$
Alice, G. S	Mont...	.....	166,714
Boston & Montana, G	Mont...	66,500	215,419
Caledonia, G.	Dak....	19,735	61,971
Christy, S	Utah...	.....	43,595
Chrysolite, S	Colo...	.....	35,671
Colorado Central, S	Colo...	20,533	68,709
Daly, S	Utah...	‖66,510	126,728
Deadwood-Terra, G	Dak....	44,814	108,820
Derbec Blue Grav., G. S	Cal...	.....	29,721
Elkhorn, G. S	Mont...	.....	42,551
Eureka, S. L	Nev. ..	—— ——	15,905
Father de Smet, G	Dak....	26,023	61,376
Freeland, G. S. C	Colo...	28,114	72,206
Granite Mountain, S	Mont...	.....	252,400
Head Center Cons., S	Ariz...	.....	1,936
Hecla, G. S. L. C	Mont...	82,157	251,303
Holmes, S	Nev....	.....	115,791
Homestake, G	Dak....	106,629	300,461
Hope, S	Mont...	.....	12,400
Iron Hill, S	Dak....	.....	87,000
Lexington, G. S	Mont...	91,049	218,637
Montana Limited, G. S	Mont...	145,600	356,705
Moulton, G. S	Mont...	76,450	138,500
New Pittsburg, S	Colo...	2,250	5,230
Ontario, S	Utah...	.....	384,686
Plymouth Consolidated, G	Cal....	53,854	155,148
Plutus, G. L. C	Colo...	14,778	67,874
Ropes, G. S	Mich...	.....	5,906
Standard Consolidated, G	Cal	.....	29,597
Tombstone, G. S. L	Ariz....	*58,714	194,336
Total		.....	$3,627,687

G., gold; S., silver; L., lead; C., copper; M., mica. Silver valued by the different companies from $1@$1.29 per ounce; gold, $20.67. *Not including value of lead and copper. †Royalty. ‡Net. §Ore sales. ‖Not official. —No shipments during month mentioned.

WISCONSIN.

BALD MOUNTAIN CONSOLIDATED.—This company has been incorporated in Milwaukee, to do a general mining business in any part of the United States. The capital stock is $2,000,000.

HURLEY IRON MINING COMPANY.—The company's object is to deal in mineral and other lands. The capital stock is $500,000.

MARKETS.

Silver.

NEW YORK, Friday Evening, April 16.

DATE.	London. Pence.	N. Y. Cents.	DATE.	London. Pence.	N. Y. Cents.
April 10.	46⅛	101⅝	April14	46 5-16	101¼
12.	46⅛	101⅛	15	46 3-16	101
13.	46 7-16	101⅛	16	46 3-16	101

The market has steadily declined since our last issue, the result, as we are advised, of extreme dullness in India business at London.

Foreign Bank Statements.—The governors of the Bank of England, at their regular weekly meeting, made no change in the bank's minimum rate of discount, and it remains at 2 per cent. During the week, the bank lost £208,216 bullion; but the proportion of its reserve to its liabilities was increased from 40$\frac{11}{16}$ to 42¼ per cent, against 48 per cent at this date last year. On the 15th inst., the bank lost £22,000 on balance. The weekly statement of the Bank of France shows a gain of 1,340,000 francs gold, and a gain of 3,505,000 francs silver.

Copper.—Copper is dull and quiet in this market, though prices are nominally unchanged at 11½c. for Lake, and 10@10½c., according to quality, for other brands. Our exports continue very light; during the week, only 623,800 pounds of matte and 112,072 pounds of bars were exported, while we again imported copper to the amount of 350,045 pounds. There are no stocks of any importance, and producers are firm and indifferent. Chili still remains weak; it is quoted to-day in London £41 10s.

Messrs. Henry Bath & Sons report, under date of April 1st, as follows:

"The charters for second half of this month are advised to-day as 1400 tons fine copper. Price of bars, $17.60, with exchange 24⅛d. Deliveries for the fortnight have been 4835 tons, against imports 8490 tons. The total visible supply is 58,486 tons, against 57,985 tons last fortnight. American arrivals have been 1184 tons into England and 300 tons into France = 1484 tons, making 4233 tons from January 1st, against 7851 tons last year.

"During the fortnight, 360 tons of ingots have been reshipped to the States.

"The arrivals from America have principally been Anaconda matte and other matte, being remainder of contracts made last year. In view of the depleted state of the stocks of furnace material at Swansea and Liverpool, it is difficult to see what is to prevent our smelters having to fall back on bars for their needs within the next month. The sale reported to-day of 500 tons Anaconda matte for May arrival is at 3d. a unit more than was paid for the 1000 tons April arrival when bars were £42 2s. 6d.

"The transactions in furnace material have been 3230 tons ore at 6s. 9d. for low produce Portuguese, 7s. 3d. for Concentrates, 8s. for Quebrada, and 8s. 6d. to 8s. 9d. for Cape; 1511 tons Quebrada, Newfoundland, American, and Chili Regulus at from 8s. to 8s. 6d.; and 150 tons Spanish Precipitate at 8s. 4½d. to 8s. 6d. per unit."

Tin.—This market is quiet at 20·60@20·75c. There were imported during the week at this port 301,219 pounds of tin, and 16,778 boxes tin plate.

Lead.—The Omaha Works, through its agent here, has been offering lead at 4·70c., which is consequently the present quotation, though the object or necessity for the decline is not apparent. About 500 tons of lead have been sold during the week at 4·85c., down to 4·70c. Of course, this decline will stop importation.

The strikes of the Knights of Labor are producing their inevitable result—creating distrust in the future, lessening consumption, and generally injuring business, and lessening the ability of nearly every industry to pay even the present rates of wages. The outcome may not unlikely be a lowering rather than an increase in wages.

London cables to the Metal Exchange quote Soft Spanish £13 7s. 6d.; English, £13 15s.

In manufactures, we quote Sheet-lead, 7·20c net, and Lead Pipe, 5·40c. net. Shot, Buck and Chilled, 6c., in 25-pound bags.

Messrs. Everett & Post, of Chicago, telegraph to us to-day as follows:

The market is very flat and weak, manipulation East affecting values; and buyers, expecting a decline, are holding off and only buy for immediate wants. The market stands with the following bid and asked: 4·55, 4·60, 4·65c. The stocks in hands of holders are limited, and production unchanged.

Messrs. John Wahl & Co., of St. Louis, telegraph to us as follows to-day:

In sympathy with other markets, an increasing dullness has characterized our lead market. There has been a weak feeling all around, carrying down the prices to 4·60c. for Corroding and 4·55c. for Chemical. Sales for the week sum up 400 tons Refined, prices ranging from 4·75c. down to 4·60c.; 300 tons Common were sold at prices ranging from 4·60c. down to 4·55c.

Spelter.—This market is unchanged. We quote 4·50@4·60c. for Missouri Domestic, according to quality, and 6¼@6½c. for New Jersey. New Jersey Zinc Oxide is quoted 3½@4c. Silesian Spelter is quoted in London to-day £14 7s. 6d. and here at 5c.

Sheet-Zinc is worth 5½@5·60c.

Kühlow's trade report says: Of the zinc furnaces in Upper Silesia, four have been put out of blast this year, so that there are 22 in activity, while recently there have been 40 distilling-furnaces less in work than last year, some being in course of repair. The production has, as a consequence, been less. The production of zinc lead has been decreased by the falling off at the Scharley-Galmei mines, the property of several concerns, these mines being nearly worked out. Zinc quotations have lately been as follows: Prime zinc, 29 to 29·40 marks, free wagon at Breslau; other brands, 28·40, 28·60, and 28·80 marks, according to place of delivery.

Antimony.—This market is quiet at 8¾c. for Hallett's, 9¼c. for Cookson's here, and in London £34 for Hallett's.

Nickel.—We quote 70c. nominal.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, April 16.

American Pig.—The market remains unchanged in price for standard brands, though with a certain weakness in the prices of less known brands. Unquestionably, the strikes and labor uncertainties have injured this industry, as they have most others, by creating a disinclination on the part of business men to count much on the future, and on the part of capitalists to embark in enterprises dependent on steady labor for success.

The Knights of Labor have made a sad mistake in nipping in the bud the flower of our reviving prosperity, and they will necessarily be the chief sufferers. We continue to quote $18@$18.50 for No. 1 X; $17 @$17.50 for No. 2 X; and $16@$17 for Forge, standard Lehigh brands, tide water delivery. For special irons, 50c. and $1 more is asked.

Scotch Pig.—This article still comes in—1000 tons having arrived during the week—and it continues to move off, though at unsatisfactory prices. We hear of a sale of 200 tons Gartsherrie, from dock, at $18.50, and though this is perhaps too low a price to serve as a quotation, having been accepted under exceptional conditions, we quote as follows: Coltness, $20; Gartsherrie, $19; Summerlee, $19.50@$20; Dalmellington, $18; Eglinton, $18. Freights range about 4s., 5s. being asked and 3s. 6d. offered. Cables to the Metal Exchange to-day quote: Coltness, 47s. 6d.; Summerlee, 46s. 6d.; Langloan, 44s. 6d.; Gartsherrie, 43s.; Glengarnock, 43s.; Dalmellington, 41s.; Eglinton, 39s.; Warrants, 38s. 6d.; Middlesboro', No. 3, 30s.

Bessemer Pig.—The market is quiet. We quote Domestic at $18@$18.25 at the furnace, and Foreign ex ship about 50 cents more.

Spiegeleisen.—This market is weak. We quote

English, $26.50@$27; German, $26. Eighty per cent ferro-manganese is quoted at $67.

Structural Iron and Steel.—Prices remain unchanged. We quote Angles, 1·90@2·10c. delivered; Tees, 2·35c.; Iron Beams and Channels, 3c. for American from dock. Steel angles, 2·35@2·40c.

Plate Iron.—Common Tank, 2@2·15c.; Refined, 2¼c.; Flange Iron, 3¼@3·5c.; Extra Flange, 4@4·25c.

Bar Iron.—Refined we quote at 1·80@1·95c.; Common, 1·55@1·70c. Store prices are ·10@·20c. higher.

Steel Plates.—We quote 2½c. for Tank; 3@3¼c. for Boiler and Ship Plates; 3¾@4c. for Flanges; 4¼@5¼c. for Extra Flange and Fire-Box Plate.

Merchant Steel.—American Tool Steel, 7@10c.; special qualities, 12@18c.; Crucible Machinery, 4½@5½c.; Bessemer and Open-Hearth Machinery, 2½@2¾c.

Old Rails.—Old Rails are dull. We learn of sales of 1000 tons at private terms, but we continue to quote: Double-Heads at $20, and Tees $19.

Steel Rails.—This article continues to be the most encouraging feature of the market. The mills being all nearly fully booked up with orders to their capacity, are very independent, and those that a few weeks ago quoted $34 are now $35, and can scarcely be induced to take an order.

The Marquette *Mining Journal* doubts the truth of the report that the Chicago, Burlington & Quincy Railroad, in giving its order to an American mill, stipulated that foreign Bessemer iron should be used. Nevertheless, the report was correct, only it might have been added that out of orders for 56,000 tons given by this company to American mills, the stipulation to use foreign Bessemer pig was limited, we believe, to but one, or at most two, mills, where the native stock (mostly Lake ores) is too high in phosphorus.

The rail mills had, on April 1st, taken orders for 869,321 tons of rails, not including some orders from the previous year; and since the first of the month, additional orders have been booked, bringing the totals at the present time probably nearly to 1,000,000 tons. It is probable that the limit will soon be made the full capacity of each of the mills, which would be possibly 1,200,000 tons, and each will make what it can, for it is evident the market will take all the mills can produce.

Scrap.—Quotations are unchanged at about $20 for choice lots.

Philadelphia. April 15.

[From our Special Correspondent.]

The week's business in the iron trade has been disappointing to some of those who have been looking for a very active April. In pig-iron, prices remain exactly where they have been for a month. The offers made at from 25 to 50 cents a ton for the standard and special brands below the asking prices have not moved makers, who feel that their safety lies in selling only what iron they make, and letting the summer take care of itself. Considerable uncertainty exists among buyers of iron, as to the probable course of prices, some arguing that the large increase in production during the past twelve months will of necessity react in favor of lower prices, on account of the general unrest throughout the country. The statement of pig-iron makers to-day does not justify expectations of lower prices. All of the stronger companies have contracts running along from one to three months, and are perfectly satisfied with the situation, and are able at any time to place more iron if they want to. They prefer to not extend their engagements at this time unless their prices are paid. Very little really first-class iron is offered on the market, and buyers are ready to pick it up at fair prices if it is. In forge iron, some little weakness has been manifested in the lower grades. Quotations are $16@$16.50. Some iron has been sold at less, and there are several brands that will bring more. The bar-iron makers have not been buying much or saying much about what they will want or what they will do.

Muck-Bars.—Two or three sales were made this week at $30. Muck-bar inclines downward. The very best brands are worth a little more.

Blooms.—No change has taken place in quotations for anthracite or charcoal blooms.

Manufactured Iron.—The mills are working along about as they have been, doing a retail business. Common iron was bought this week at $1.60; Medium, $1.70; Refined, $1.80@$1.90. There is no room for much fluctuation. The amount of business is up to the average.

Nails.—Nails are firm at $2.40@$2.50. Lower prices have been taken in a few cases, but the influences at work are in favor of higher rather than lower prices.

Plate Iron.—Ordinary plate is 1.90@2c. Some new business has been done this week in shell and flange iron for delivery next month.

Structural Iron.—Specifications for a few hundred tons of structural iron are in hand. Angles are 1·90c.; Beams and Channels, 3c. Agents of Pennsylvania mills are now in the West, figuring on some bridge work there.

Wrought Iron Pipe.—The wrought-iron pipe makers throughout the State have an abundance of business on hand, and card rates are strictly adhered to.

Steel Rails.—Small lots of rails sold at $35@$35.50. Prices are strong, and as mills are over-sold, there is no inclination to yield, excepting in some instances, where railroad builders have inquiries in for large lots running from 5000 to 10,000 tons.

Old Rails.—Old rail quotations run from $20@$22. Buyers are very backward. The supply is increased and a further drop is looked for. Between 2000 and 3000 tons were contracted for this week.

Scrap.—Scrap is moving a little more freely to interior points at $19.50@$20.50.

There is nothing new in the coal situation. The bituminous strike does not appear to be coming to an end, and a large quantity of anthracite is moving East.

Pittsburg. April 15.

[From our Special Correspondent.]

Pig-Iron.—The market continues to move along slowly, dealers generally confining their purchases to limited amounts to supply immediate wants and for use as mixtures. The general impression is, that there will be no further advance at present. Further sales are reported to us of Southern-made pig-iron. As compared with Pittsburg furnaces, prices are from 50c. to 75c. a ton lower. It is yet too soon for manufacturers to decide how it will suit. The sales, so far, exceed 3000 tons of various descriptions. Freights from Chattanooga to Alleghany City are $4.35 a ton; from Birmingham, $4.85; from Chattanooga to Pittsburg, $5.50; from Birmingham to Pittsburg, $5. The most remarkable feature in regard to pig-iron is, that the steady increase in production, and that without any perceptible increase in the supply, seems almost unaccountable. Such are the facts, however, and the only reasonable explanation is, that consumption is much larger than even parties in the trade had any idea of. The inevitable conclusion is, that the volume of business has been underestimated, and while there may yet be some shrinkage before midsummer, a careful review of the position can not fail to be encouraging to sellers. Southern pig-iron is in fair demand, without any change in price.

Coke, No. 1 Mill, $16.50 4 months; No. 2 Mill, $15.50 cash; Mottled, $14.25 cash. Charcoal, No. 1 Foundry, $20.75 cash; No. 3, Hot-Blast Tennessee Charcoal, $19.50 cash; $20 4 months.

Pig-Iron.—The current rates are as follows:

Coke or bituminous:	Lake ore.	Native ore.
Foundry No. 1	$17 50@$18.00	$17.50@$18.00
Foundry No. 2	16.75@ 17.25	16.50@ 17.00
Gray Forge, No. 3	16.00@ 16.50	15.75@ 16.25
" " No. 4	15.25@ 15.50	....@ .....
White	14.50@ 15 00	14.50@ 15.00
Mottled	15.00@ 15.50	15.00@ 15.50
Bessemer	19.50@ 20.00	....@ .....
Charcoal:		
Foundry No. 1	21.50@ 23.00	
Foundry No. 2	20.00@ 20.50	
Cold-Blast	25.00@ 28.00	
Warm-Blast	18.00@ 24.00	

Muck-Bars.—No sales reported; buyers holding off; quotations, $27.75@$28 cash.

Spiegel.—Moderate inquiry; $28.50@$29 cash.

Steel Blooms.—Last sale reported, $31@$36.

Steel Rail Crop-Ends.—Offered, $23.

Steel Slabs.—Current rates, $29@$33.

Old Iron Rails.—Demand fallen off. We quote nominally $22. It was reported that they could be bought at $21.50.

Wrought Scrap.—Demand less active, and buyers not anxious to invest. Holders ask for No. 1, $19.50@$20 cash; No. 2, $17@$18.

Steel Rails.—Steady at previous advance, $36; Light Sections, $35@$42.

Bar Iron.—Dull; $1.70@$1.75 per cwt.

Nails.—Unchanged, $2.25@$2.30 a keg; 1046 machines are working at manufacturers' scale. Week's increase, 14 machines. At the nail manufacturers' meeting yesterday, at Wheeling, the 17-cent scale was reaffirmed. The manufacturers are now perfectly satisfied with the employment of feeders running their machines.

SALES.

900 tons	Gray Forge Lake ore	$16.50 cash.
350 "	Mottled " "	14.25 "
500 "	Southern Gray Forge	16.50 4 mos.
60 "	" Forge No. 1	17.75 cash.
50 "	" No. 2	17.00 "
50 "	Tennessee hot-blast charcoal	20.50 "

Louisville. April 15.

[Reported by GEORGE H. HULL & CO.]

The market for pig-iron shows some improvement, and there is more inquiry for small lots than has been the case for fully three months. More iron might be sold at a concession of 50 cents a ton, but most furnaces are holding prices firm. From various points in the interior, where irons have been offered at full prices, reports come back declining offers, saying the parties have been able to supply their demands at a lower price, but whether with Southern irons or Ohio irons is not stated, although it seems quite evident that markets in the North are cut by irons from some other location. We quote for cash as below:

PIG-IRON.

Southern Coke No. 1, Foundry	$18.00@$18 50
" " No. 2, "	17.00@ 17.50
" " No. 2½, "	16.50@ 17.00
Hanging Rock Coke, No. 1, Foundry	17.75@ 18.50
" " Charcoal, No. 1, Foundry	20.00@ 21.00
Southern Charcoal, No. 1, Foundry	18.00@ 19.00
Silver Gray, different grades	15.50@ 16.50
Southern Coke, No. 1 Mill, Neutral	16.00@ 16.50
" " No 2 " "	15.00@ 15.50
" " No. 1 " Cold Short	15.50@ 16.00
" Charcoal, No. 1 Mill	17.50@ 18.00
White and Mottled, different grades	13.00@ 14.50
Southern Car-Wheel, Standard Brands	25.00@ 26 00
" " " Other "	21.00@ 22.00
Hanging Rock, Cold-Blast	27.00@ 28.00
" " Warm-Blast	21.00@ 22.00

COAL TRADE REVIEW.

NEW YORK, Friday Evening, April 16.

Statistics.

Production Anthracite Coal for week ended April 10th, and year from January 1st:

TONS OF 2240 LBS.	1886.		1885.	
	Week.	Year.	Week.	Year.
P. & Read. RR. Co.	190,944	2,655,411	257,677	2,455,954
L. V. RR. Co.	110,809	1,666,495	130,931	1,060,596
D. L. & W. RR. Co.	72,773	1,506,414	82,751	1,059,190
D., & H. Canal Co.	60,419	1,128,646	67,377	695,014
Penna. RR.	55,294	875,365	50,124	728,763
Penna. Coal Co	30,235	319,710	27,556	284,636
Total	520,474	8,152,041	616,416	6,284,353
Increase		1,867,688		
Decrease	95,942			

* Estimated.

The above table does not include the amount of coal consumed and sold at the mines, which is about six per cent of the whole production.

Production for corresponding period:

1881	6,721,875	1883	7,226,941
1882	6,710,348	1884	6,908,011

Production of Coke on line of Pennsylvania RR. for week ended April 10th, and year from January 1st:

Tons of 2000 pounds.

	1886.		1885.	
	Week.	Year.	Week.	Year.
Alleghany Region.	101	49,464	3,196	51,873
West Penn. RR.	2,706	26,421	1,292	7,537
Southwest Penn. RR	50,246	539,859	35,424	518,837
Penn. & W. Region	5,255	91,448	3,409	69,782
Monongahela	3,584	27,240	2,116	23,059
Pittsburg Region.				
Snow Shoe		9,211	237	4,253
Total	61,892	743,643	45,674	675,341

Production Bituminous Coal for week ended April 10th, and year from January 1st:

Tons of 2000 pounds, unless otherwise designated.

EASTERN AND NORTHERN SHIPMENTS.

	1886. Week.	1886. Year.	1885. Week.	1885. Year.
Phila. & Erie RR...	.....	3,987	.....	.....
*Cumberland, Md..	†	371,310	62,280	591,386
*Barclay, Pa.....	3,921	55,790	3,698	71,940
*Broad Top, Pa.				
H. & Broad Top RR.	10,346	89,774	3,956	46,189
East Broad Top....	.....	.....	.....	.....
Clearfield Region, Pa.				
Snow Shoe.....	.....	34,770	3,267	59.316
Karthaus (Keating)	2,000	37,543	2,020	43,380
Tyrone & Clearfield	7,577	553,808	65,638	871,844
Alleghany Region, Pa.				
Gallitzin & Mountain....	1,249	171,792	9,498	139,640
Total..... ..	25,093	1,318,774	150,357	1,823,695

* Tons of 2240 lbs.

† Report not received.

WESTERN SHIPMENTS.‡

Pittsburg Region, Pa.				
West Penn RR.....	6,392	73,902	7,788	76,792
SouthwestPenn.RR.	5,745	44,045	2,202	30,457
Pennsylvania RR...	4,672	54,789	429	51,310
Westmoreland Region, Pa.				
Pennsylvania RR...	9,606	314,693	4,283	248,748
Monongahela Region, Pa.				
Pennsylvania RR...	9,283	68 485	3,406	52,939
Total.....	35,698	555,914	18,108	460.246
Grand total	60,791	1,874.688	168,465	2,283,941

‡Considerable gas-coal shipped East, of which no division is made in report.

The Norfolk & Western Railroad Company reports the shipments of Pocahontas Flat-Top coal for the week ended April 10th, 1886, and year from January 1st as follows, tons of 2000 pounds: 1886—Week, 17,518; year, 263,752. 1885—Week, 11,516; year, 140.699. Increase, 1886—Week, 6002; increase, year, 63,053.

Anthracite.

There has been but a moderate amount of new business during the week under review. Previous to the meeting of the managers at Mr. J. Pierpont Morgan's house, or before the advance agreed upon at that meeting could be put into force, there was a very large number of orders booked at the low prices. These are filled as rapidly as possible, and have greatly reduced stocks. This, in connection with the small allotment (2,000,000 tons) for this month, will tend to put the market in excellent shape to receive and maintain the advance of 25 cents a ton, which it is thought will be made on May 1st. Domestic sizes of coal have not been as active as could be desired, and, as a consequence, show occasional signs of weakness, especially for stove. Still, most shippers claim that they are not pressed with this size, and are getting full prices. This trouble, however, will be overcome if the demand for manufacturing sizes maintains any thing like the proportions it has attained. A large part of this improvement can be depended upon to continue; but there is still much of it due to the scarcity of bituminous coal, owing to the strike of bituminous miners. This, however, is only beginning to show to a marked degree, and promises to be very much greater if the men do not resume work very soon. The smaller sizes of coal have become very scarce, and have a strong upward tendency in prices. Some pea coals have already advanced as much as 50 cents a ton. Although broken and egg sizes have not advanced, they are becoming very scarce, and are likely to do so soon, without any assistance from the combination except that which comes from curtailment of production.

A very encouraging feature to the trade is the large increase in the number of anthracite iron furnaces in blast on April 1st, as compared with March 1st, while, as compared with October of last year, the increase is 56 per cent. This will give the companies a large extension in local business, which will add greatly to their profits, while, at the same time, it will avoid the necessity of crushing a considerable amount of coal, and thus greatly decrease the usual waste, while tending to an equalization of the sizes produced to the requirements of the market.

Those who are thoroughly familiar with the details of production, consumption, and stocks on hand, are greatly encouraged by the belief that so far this year fully 1,500,000 tons more coal seem to have gone legitimately into consumption than during the same period of last year, while the weather of the winter and spring months of 1885 were much more conducive to coal consumption.

So far, the coal combination seems to have worked better than any previous arrangement. There seems to be a better observance of the true spirit of the agreement than heretofore. One of the most encouraging signs is, that the Delaware, Lackawanna & Western Company is urging the production for May to be made 2,000,000 tons. From Philadelphia, however, where the immediate financial necessities are greater, a larger production is asked for, and it is thought that about 2,250,000 tons may be agreed upon. There are strong hopes of getting the individual shippers on the Pennsylvania Railroad, who were not included in the arrangement completed a week ago last Monday, to enter it in perfect harmony.

We still urge on readers to purchase coal at present prices, believing that they are as low as they will be this year. Furthermore, as previously stated, it is an unsafe year to be without liberal stocks, as there are plenty of indications that there may be serious labor troubles, when it would be impossible to get coal at any price.

We quote ordinary free-burning coals f. o. b. as follows:

	Week ended April 16.	April 9.	April 2.
Lump.....	$3.00@	$3.00@	$3.00@ ....
Steamboat .	3.00@	3.00@	3.00@ ....
Broken.	2 85@	2 85@	2.85@ ....
Egg	2.85@	2 85@	2.85@ ....
Stove	3.10@$3.30	3.20@$3 35	3.25@ ....
Chestnut....	3.00@	3.00@	3.00@ ....
Pea	2.00@ 2.15	2 00@ 2.15	1.75@$2.15
Buckwheat.	1.65@ 1.75	1.75@	1.50@ 1.75
Dust	1.20@ 1.25	1.15@ 1.25	1.15@ 1.25

Bituminous.

There is an enormous demand for bituminous coal, which is met by new districts at fancy prices, or is supplied by anthracite coal. The strike embraces quite as many miners this week as it did last. There are some encouraging signs, but it is still impossible to say when a resumption of work will take place. One of the most encouraging features is, that the Cumberland miners have appointed local committees to confer with each of the companies. As these men know their own wants and the business of the companies that employ them much better than outside leaders, there will be some chance of coming to a reasonable understanding and an early return to mining. If the strike continues much longer, many concerns that are now using bituminous coal will contract for a year's supply of anthracite, which will react as severely upon the striking miners as upon the companies. On another page, we give a circular addressed to their employés by the Clearfield companies.

It is announced that the Vessel Owners and Captains' National Association has made a reduction of five cents a ton in freights to points west of Cape Cod from Hampton Roads, Georgetown, Baltimore, and Philadelphia. Hereafter the minimum rates will be as follows: From Georgetown and Baltimore to New Haven and Bridgeport, Conn., Rhode Island ports, and New Bedford, $1; and from Hampton Roads and Philadelphia to the same ports, 90 cents. This association now numbers 942 vessels, being about 85 per cent of the sea-going coal-carrying fleet afloat. The officers of the association report that the minimum freights and association bill of lading have been accepted by the entire coal trade and are strictly observed.

Buffalo. April 15.

[From our Special Correspondent.]

It is generally believed that the opening prices of anthracite coal will be higher than those of 1885, but nothing has transpired here as to what those prices will be and when they will be announced, except that, with regard to the latter, rumor says May 1st.

There are no special incidents to make public. Traders are arranging for the opening of the season's business, and shippers and vessel-men come together on 'Change daily for consultation.

The bituminous coal trade runs in the same old groove. There does not appear to be any scarcity on general principles, but some varieties are wanting. There is no fear of a famine, strike or no strike. Of course, the feelings of the owners of the mines can be gauged by the knowledge as to whether their property is producing or not; while the dealer, if he can not supply the kind his customers need, does the next best thing, namely, furnish an article as near like as possible, and preserves his serenity.

Coke is steady and without new features.

The idea of taking the United States duty off coal is meeting with some favor. Parties outside the producing element "go in" for the change, for the reason that the grip of the so-called monopolists may be weakened, if not altogether removed. The allotment system, combined with the restriction of production, is claimed by many to be a dangerous conspiracy against every man in the country who buys coal; and others ask, Why should a tariff be continued for the benefit of the combination?

The ice here is softening quite rapidly, and it has broken up considerably in the past three days. The weather is warm, and if no further storms prevail to anchor the ice in shallow water, in a few days vessels will leave for Toledo, Detroit, and the upper lake ports. The latest news from the Straits states that the harbors at different points show that the water is freer from obstructions, and that navigation may open generally at any moment.

Navigation is open from Charlotte to Toronto Lake Ontario ports.

Mr. Joseph Ball, of the Delaware & Lackawanna Company, has been appointed, for the present, chartering agent here of the members of the Merchants' Exchange shipping coal by lake. On Monday, the following schedule of rates was agreed to be paid by shippers: To Chicago, 60c.; to Milwaukee, 55c.; to Toledo, 40c.; and to Duluth and Lake Superior ports, 50c.; all per gross ton. There is now hardly a doubt that the season's freights will be made by the gross instead of the net ton. Several propellers and barges have been chartered for Toledo at the before-mentioned gross rates.

It is said that the Buffalo, Rochester & Pittsburg Railroad has sold all its canal-boats, which were in use for two seasons carrying coal to and from this port. The fleet consisted of seven propellers and nine consorts.

The points conceded by the Natural Gas Company are some of those made in the Mayor's first veto. They insure the establishment and maintenance of the company's head-quarters in Buffalo; the fixing of a maximum price (75 cents per 1000 feet); and provides for the purchase of the plant after the expiration of twenty years. These amendments were adopted by the Council last Monday. On the whole, it must be allowed that the grant is fairly restricted, although many claim that the privileges allowed should have been more pecuniarily beneficial to the city.

A conundrum: Will the introduction of natural gas into Buffalo next fall have any, and if any, what, influence on the price of coal, whether bituminous or anthracite?

The Directors of the Buffalo Coal Exchange are: Thomas Hodgson, President; J. J. McWilliams, Vice-President; C. M. Underhill, Treasurer, and M. S. Burns, Secretary; also Messrs. C. D. R. Stowitz, T. Guilford Smith, E. S. Hubbell, H. E. Smith, Adam Schell, J. H. Horton, and George Dakin.

Boston. April 14.

[From our Special Correspondent.]

The increased firmness shown by the companies has not caused any noteworthy activity in this market. Dealers are loth to take on any large amount of coal at this time of the year, because the assessors make their visit very shortly. The situation is also one that advises delay. The basis of 33,500,000 tons output is too large, even allowing for a great increase in demand for steam sizes on account of the soft coal strike, which may possibly amount to from 500,000 to 1,000,000 tons. Also reckoning in the increased demand to come from the continued development of Western trade, it looks as if there must be a large surplus; for all the markets have never taken over 31,000,000 tons in the aggregate. We are forced to weigh the value of a combination that evidently does not intend to restrict, and upon the value accorded to such a combination the buyer's views must be based.

At present prices, coal is a good purchase if the market is to be controlled by the companies; for (taking stove coal as a basis) good coal can be had at $3.40 f. o. b. at New York, when $3.65 was the lowest price last year, and $4.15 the highest. If the market is not to be controlled with the view of restricting, it does seem as though the improvement would only be temporary. To our mind, the companies are thankful that they

NEW YORK MINING STOCKS.

DIVIDEND-PAYING MINES.

Name and Location of Company.	Highest and Lowest Prices per Share at which Sales were Made.												Sales.
	April 10.		April 12.		April 13.		April 14.		April 15.		April 16.		
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Alice, Mon.	.....	.....	.....	.....	1.50	.....	1.50	.....	.....	.....	.....	.....	400
Amie Con., Co.	.....	.....	.04	.....	.....	.....	.....	.....	.....	.....	.03	.....	4,000
Argenta	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bassick, Co.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Belle Isle, Ne.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bodie Cons., Ca.	1.05	.....	1 05	.....	.....	.....	1.00	.....	.....	.....	1.05	.....	1,400
Breece	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bulwer, Ca.	.60	.58	.60	.....	.....	.....	.....	.....	.60	.....	.62	.61	6,200
Cal. B. H.	.95	.....	.95	.....	.....	.....	.....	.....	1.00	.....	1.00	.....	700
Castle Creek	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chrysolite, Co.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.51	.....	100
Colorado Central	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cons. Cal. & Va., Ne.	2.10	2 05	2.10	2 05	2.10	.....	2.10	2.05	2.10	.....	2 05	2 00	5,650
Crown Point	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Dunkin, Co.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Eureka Cons., Ne.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Father de Smet, Dk.	1.00	.....	.....	.....	.....	.....	.....	.....	1.00	.....	1.00	.....	700
Freeland	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.25	.....	100
Gold Stripe, Ca.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gould & Curry, Ne.	.....	.....	.....	.....	.63	.....	.....	.....	.....	.....	.....	.....	300
Grand Prize, Ne.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Green Mountain, Ca.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hale & Norcross, Ne.	2.50	.....	2.65	.....	2 55	.....	2.50	.....	.....	.....	2.50	.....	1,600
Hall-Anderson, N. S	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Homestake, Dk.	.....	.....	18.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	30
Horn-Silver, Ut.	.....	.....	2.95	.....	3.00	.....	2.90	.....	.....	.....	.....	.....	400
Independence, Ne.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Iron Silver, Co.	.....	.....	.....	.....	1.95	.....	.....	.....	.....	.....	.....	.....	500
Leadville C., Co.	.23	.22	.....	.....	.....	.....	.....	.....	.....	.....	.24	.....	3,300
Little Chief, Co.	.22	.....	.22	.21	.22	.....	.....	.....	.....	.....	.....	.....	1,200
Little Pittsburg, Co.	.....	.....	.30	.....	.30	.29	.....	.....	.....	.....	.....	.....	500
Martin White, Ne.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Moulton	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Navajo, Ne.	.....	.....	.....	.....	.....	.....	.23	.....	.....	.....	.....	.....	900
North Belle Isle, Ne.	.....	.....	.....	.....	.....	.....	.22	.....	.....	.....	.....	.....	1,700
Ontario, Ut	.....	.....	29.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	55
Ophir	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Osceola	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Plymouth	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Quicksilver Pref., Ca.	.....	.....	21.50	21.25	.....	.....	.....	.....	.....	.....	.....	.....	200
" Com., Ca.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Quincy	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Robinson Cons., Co.	.75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	400
Savage, Ne.	1.30	.....	1.30	.....	.....	.....	.....	.....	.....	.....	.....	.....	500
Sierra Nevada, Ne.	.55	.....	.....	.....	.55	.....	.55	.....	.....	.....	.55	.....	2,100
Silver King, Ar.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Spring Valley, Ca.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Standard, Ca.	.....	.....	.....	.....	.80	.....	.....	.....	.....	.....	.....	.....	100
Stormont, Ut.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tip Top, Ar.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Yellow Jacket	.....	.....	.....	.....	.....	.....	.90	.....	.....	.....	.....	.....	200

NON-DIVIDEND-PAYING MINES.

Name and Location of Company.	Highest and Lowest Prices per Share at which Sales were Made.												Sales.
	April 10.		April 12.		April 13.		April 14.		April 15.		April 16.		
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Albion	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Alta	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
American Flag	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Barcelona, G.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bechtel Con., G.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Belvidere	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Belcher	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Best & B'cher, G. S.	1 30	.....	1.30	.....	1.20	.....	.....	.....	1 25	.....	1.20	.....	1,550
Big Pittsburg, S. L.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bowman Silver	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bull-Domingo, S.L.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Central Ariz'na, S.	.....	.....	.....	.....	.....	.....	.....	.09	.....	.09	.....	.....	1,000
Chollar	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cons. Imperial	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Con. Pacific	.....	.....	.08	.....	.....	.....	.....	.....	.....	.....	.....	.....	200
Cusi	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Decatur	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Durango, G.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Eastern Oregon	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Goodshaw, G.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Harlem M. & M. Co.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Harshaw	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Kossuth	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lacrosse, G.	.09	.....	.09	.....	.08	.....	.09	.....	.09	.....	.09	.....	9,500
Mariposa Pref., G.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
" Com., G.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mexican, G. S.	.53	.....	.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	800
Mono	.....	.....	.....	.....	2.45	.....	.....	.....	.....	.....	.....	.....	350
New Pittsburg	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
North Standard, G.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
N. Horn-Silv'r, S L.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pri'nt'l & Miller, S	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Plutus	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Potosi	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rappahannock, G	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.12	.....	1,000
Red Elephant, S.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ridge	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Silver Cliff, S.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sonora Con.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
South Bodie, G.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
South Bulwer, G.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
South Hite	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
South Pacific	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
State Line, 1 & 4, S.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
" Nos. 2 & 3, S.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sutro Tunnel	.18	.....	.18	.....	.....	.....	.....	.....	.....	.....	.17	.....	3,500
Tamarack	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tioga	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Unadilla, S	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Union Cons., G. S.	.....	.....	.....	.....	.42	.....	.....	.....	.....	.....	.50	.....	1,000
Utah	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Dividend shares sold, 33,635. Non-dividend shares sold, 18,900.

have been able to keep the market from utter demoralization, and that they will have achieved more than they expected to if they work a permanent improvement.

There is nothing new in bituminous coal. The wrestle for coal continues, and grows more and more severe. Spot cargoes will quickly bring $3.50. Before the strike, $3.50 would have been high. Retailers are selling small lots at $5 even. As a general thing, shippers in the regions where the strike is on have sold no coal since the trouble began. The regions where men are at work are: Beech Creek, Chesapeake & Ohio, and Pocahontas. The former are troubled for cars, and have no coal to sell. The latter are also without any surplus to offer to general trade as yet. The strike is general in the Cumberland and Clearfield districts, and, as viewed from this point, shows no signs of weakness.

Minimum rates of freight continue, and efforts to break them are unsuccessful, save as we hear of a few concessions in bridge charges. Nothing doing at Baltimore. We quote rates exclusive of discharging:

New York, 90c.; Philadelphia, $1.05; Baltimore, nominal; Newport News, $1.05@$1.10; Richmond, $1.25; Cape Breton, $1.60@$1.75; Bay of Fundy, $1.40@$1.50.

There is a light retail movement. Prices are low and unsteady. This is particularly true of cash transactions.

Pittsburg. April 15.

[From our Special Correspondent.]

Prices continue weak here and at all the lower markets. River, wholesale on board, 4@5c. a bushel; Railroad, 4¼@4¾c.

Connellsville Coke.—The strike at some of the points was settled by the advance being paid. The ovens are running out fully 1000 cars a day. Prices remain as last quoted. Blast-Furnace, $1.35 f. o. b. cars at ovens; Foundry, $1.50; Crushed, $1.80@$2.

FINANCIAL.

Mining Stocks.

New York, Friday Evening, April 16.

Dullness has again swayed its scepter over the mining market. The transactions show a decrease of 17,080 shares, as compared with those of the preceding week, the total being 52,535 shares. Prices have been firm.

The Homestake Mining Company has declared its usual monthly dividend of $50,000, making a total to date of $3,318,750. A few sales of the stock were made at $18. Father de Smet has been quiet at $1, and Caledonia at from 95c.@$1.

The financial statement of the Standard Consolidated for March shows a balance on the 31st ult. of $24,151.44. But little interest is manifested in the stock, which is selling at 80c. Bulwer has continued the activity displayed last week; it sold at from 58 to 62c. Bodie and Mono were, respectively, $1@$1.05 and $2.45. Consolidated Pacific has dropped to 8c. Quicksilver Preferred held its own at from $21.50@$21.25.

Colorado Central again appears on the list; a few sales were made at from $2.40@$2.45. Freeland, at $1.25. Among the other Colorado stocks, Leadville and Little Chief were the most active, the former selling at from 22@24c., and the latter at 21 and 22c. Lacrosse shows large transactions at 8 and 9c.

Considerable activity has been displayed in Consolidated California & Virginia, and sales were made amounting to 5650 shares at firm prices—from $2.10 @$2. Hale & Norcross has been higher at from $2.50 @$2.65. The other Comstock shares all show a few sales; but prices have remained as last week.

Horn-Silver was almost entirely neglected; it is quoted at from $3@$2.90. Ontario ruled at $29. Alice, at $1.50.

The following securities were sold at auction in this city on the 14th inst.:

100 shares New Jersey Zinc Company, $100 each, at 72 and 74; 100 shares Pennsylvania Coal Company, $50 each, 272 and 273; 1496 shares Iron Mountain Company, of Durango, Mexico, $100 each, at $3.30 a share; 5000 Mahoning Coal Railroad Company (indorsed by Lake Shore & Michigan Southern Railroad) 5 per cent bonds, due 1934, 130¾.

Coal Stocks.

Early in the week, there were indications that the market had turned for higher prices. This, however, was short-lived, and rumored fears of additional trouble as the outgrowth of strikes and other depressing causes have produced a very weak market. The coal stocks have been comparatively strong, while sympathizing with the rest of the market.

The dealings in Lackawanna have been 171,440 shares at $128¼@$125¾, closing at $126. Reading, with sales of 36,200 shares at $25⅛@$23½, closed at the latter figure. Delaware & Hudson ranged between $102½ and $100½, and closed at $100⅝, with dealings of 8459 shares. The transactions in Jersey Central aggregated 53,213 shares at $54⅝@$50, closing at $50⅞.

Brown Brothers & Co. announce that, in accordance with the terms of their agreement with the Board of Reconstruction Trustees of the Reading Railroad and Coal and Iron Companies, they are now ready to receive deposits of the stocks and securities subsequent to the general mortgage and other claims, and to issue for them temporary certificates, to be exchanged for engraved certificates, the latter to be countersigned by the Guarantee Trust Company. Sixty days' notice will be given of the time for the payment of assessments.

Meetings.

The annual and special meetings of the following companies will be held at the times mentioned:

Brooklyn Lead Mining Company, No. 25 Park Row, New York City, annual meeting, May 10th, from one to two o'clock P.M.

Cahaba Coal and Coke Company, No. 131 Main street, Camden, New Jersey, April 23d, at twelve o'clock M., special meeting to adopt means for providing for the existing debts of the company.

Dunbar Furnace Company, No. 32 South Third street, Philadelphia, Pa., June 12th, at one oclock P.M.

Evening Star Mining Company, No. 53 Broadway, New York City, May 3d, from two to three o'clock P.M.

Grand View Mining and Smelting Company, No. 29 Wall street, New York City, May 3d, at twelve o'clock M.

Hancock Petroleum Company, No. 30 Broad street, New York City, April 22d, at three o'clock P.M.

Little Pittsburg Consolidated Mining Company, No. 11 Pine street, New York City, May 3d, from two to three o'clock P.M.

Morning Star Consolidated Mining Company, No. 53 Broadway, New York City, May 3d, from two to three o'clock P.M.

Surprise Mining and Milling Company, No. 187 Broadway, Room 13, New York City, April 26th, from one to two o'clock P.M.

COAL STOCKS.

NAME OF COMPANY.	Par value of shares.	Quotations of New York stocks are based on the equivalent of $100. Philadelphia prices are quoted so much per share.												Sales from April 10th to April 16th, inclusive.
		April 10.		April 12.		April 13.		April 14.		April 15.		April 16.		
		H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Barclay Coal														
Cameron Coal	50	15¾	15⅝	15⅞		16¼	15⅞	16⅜	16	16	15⅞	15½		3,042
Col. C. & I	10			25⅜	25⅜	26	25			25¼	25			2,045
Ches. & O. RR	100			10½		11¼	10⅝					10		775
Consol. Coal	100											23		100
Cumb. C. & I	100													
Del. & H. C	100	101⅜	100½	102¼	101⅛	102⅛	101¾	102⅛	101⅛	101⅛	100⅝	101⅜	100⅝	8,459
D., L. & W. RR	50	126⅝	126	127⅞	126½	128¼	126½	127⅝	126¾	127¼	126	126½	125¾	171,440
Elk Lick Coal Co														
Lehigh C. & N.†	50	51		51¼		51¼	51⅛							517
Lehigh Valley RR.†	50	57½		57½	57	57½	57¼			57				378
L. & W. C. & I Co														
Maryland Coal	100													
Montauk Coal	100													
Morris & Essex	50					140½	140			140½		142		739
New Central Coal	100													
N. J. C. RR	100	53¾	53	54⅝	53¾	54¼	52⅝	53¾	53	52¾	51¾	51⅞	50	53,213
N. Y. & S. Coal	50													
Penn. Coal	50													
Penn. RR.†	50	53⅝	53½	53¾	53⅛	53⅞	53⅛			53¾	53⅝			2,776
Ph. & R. RR.*	50	24½	24	25	24¼	25⅛	24¼	24¾		24¼	23¾	24	23½	51,263
Spring Mountain	50													
Westmoreland Coal†	50													

* Of the sales of this stock, 15 063 were in Philadelphia, and 36,200 in New York.
† The quotations for these stocks are not percentage, but actual price. Total sales, 294,747.

Dividends.

Adams Mining Company, of Colorado, has declared dividend No. 22, of ten cents a share, or $15,000, payable on the 20th inst., at the Farmers' Loan and Trust Company, Nos. 20 and 22 William street, New York City.

Homestake Mining Company, of Dakota, has declared dividend No. 93, of forty cents a share, or $50,000, payable on the 26th inst., at the office of Messrs. Lounsbery & Co., No. 15 Broad street, New York City.

Iron Hill Mining Company, of Dakota, has declared dividend No. 3, of five cents a share, or $12,500, payable on the 10th inst., at Deadwood, Dakota.

Philadelphia Company (Natural Gas), of Pennsylvania, has declared a dividend of one per cent out of the earnings for March, payable on the 20th inst., at the company's office, No. 933 Penn avenue, Pittsburg, Pa.

ASSESSMENTS.

COMPANY.	No.	When levied.	Delinquent in office.	Day of sale.	Amount.
Alpha, Nev	20	Mar. 4	April 8	Apl. 29	.50
Buena Vista Petroleum, Cal	33	Mar. 16	April 20	May 10	1.60
Columbia, Dak		Mar. 15	April 15	May 15	.01
Con. Amador, Cal	11	April 7	May 10	May 26	1.00
Crocker, Ariz	2	Mar. 10	Apl. 13	May 4	.20
Gould & Curry, Nev.	52	Mar. 27	Apl. 30	May 25	.40
Kearsarge, Mich				May 1	5.00
Lucky Hill Con., Nev.	3	April 5	June 7	July 7	.05
Martin White, Nev	21	Mar. 12	Apl. 20	May 20	.25
Navajo, Nev	15	Mar. 30	May 4	May 27	.25
North Belle Isle, Nev	10	Mar. 2	April 6	Apl. 28	.20
Omilak, Alaska	4	Feb. 20	Mar. 30	Apl. 17	.05
Peerless, Ariz	7	Mar. 3	April 5	Apl. 27	.25
Prompter, Ariz	7	Mar. 17	Apl. 5	May 6	.35
Ropes, Mich		Mar. 8	April 3		.10
Ruby, Dak		Mar. 13	Apl. 24	May 25	⅛

Pipe Line Certificates.

The following table gives the quotations and sales at the Consolidated Stock and Petroleum Exchange :

	Opening.	Highest.	Lowest.	Closing.	Sales.
April 10	73	73⅝	72¾	73½	2,507,000
12	74	78⅜	74	76⅞	10,927,000
13	77	77⅜	75¼	75⅞	4,729,000
14	75¾	77½	75¾	76¾	5,648,000
15	77	77	75⅜	75⅞	4,903,000
16	75⅛	75⅞	75	75⅝	2,924,000
Total sales					31,638,000

Boston Copper and Silver Stocks.

[From our Special Correspondent.]

BOSTON, April 15.

Since our last report, the market for mining stocks has been fairly active, but without any special feature. Copper stocks have been in good demand for investment ; but as yet, there is but little indication of an active speculative movement. The market, though dull, is quite firm, and it would not take a great deal to advance prices in the leading stocks. Calumet & Hecla holds steadily at about $230, with an occasional sale at $229 ; sales the past week, 78 shares only. Tamarack has been in active demand, with sales of 241 shares at $98@$100, principally at the latter price. Quincy, quite strong at $49½@$50 ; sales, 190 shares. Franklin, dull, with small sales at $13@$13¼. Osceola declined from $15@$14½, with later sales at $14⅛—188 shares. A single sale of 10 shares of Atlantic is reported at $10½. Huron sold at $2⅝. Ridge, at $⅛. Total sales for the week, about 1100 shares.

In silver stocks, there is no activity. Catalpa sold at 30c. Crescent, at 15c. Napa Quicksilver, at 95c. Bowman, at 13@14c. Dunkin, at 30c. Breece, at 23c.

3 P.M.—At the afternoon call, Tamarack sold up to $103¼ for 10 shares. Closing bids: Arnold, 40c. Bonanza, $1. Calumet & Hecla, $229. Franklin, $12½. Osceola, $14. Quincy, $49½. Boston & Montana, $6¼. Allouez, $1. Tamarack, $105 asked.

San Francisco Mining Stock Quotations.

Daily Range of Prices for the Week.

NAME OF COMPANY.	CLOSING QUOTATIONS.					
	April 9.	April 10.	April 12.	April 13	April 14.	April 15.
Albion						
Alpha						
Alta						
Argenta						
Bechtel						
Belcher	1.12½					1.12½
Belle Isle						
Best & Belcher	1.25	1.25	1.25		1.25	1.25
Bodie	1.12½	1.12½	1.12½		1.12½	1.12½
Bullion						
Bulwer	.60	.60		.55	.60	.65
Challar	1.00	1.00	1.00	.90	.90	.85
Con. Pacific	.30	.30				.25
Con. Cal. & Va.	2.12½	2.12½	2.12½	2.12½	2.12½	2.00
Crown Point			.90			
Day						
Elko Cons						
Eureka Cons		1.50	1.62½	1 75	2.25	2.25
Exchequer						
Gould & Curry	.75		.75	.75	.70	.70
Grand Prize						
Hale & Norcross	2.62½	2.75	2.62½	2.62½	2.50	2.50
Independence						
Martin White						
Mexican		.55	.50	.50		.50
Mono	2.37½	2.25	2.25	2.37½	2.25	
Mount Diablo					3.75	3.75
Navajo			.15			.10
Northern Belle						
North Belle Isle						
Ophir		.80		.75	.80	.75
Overman						
Potosi	.65	.75	.70	.65	.55	.55
Savage	1.25	1.25	1.12½	1.12½	1.12½	1.12½
Scorpion						
Sierra Nevada	.45	.50	.50	.50	.50	
Silver King						
Tip-Top						
Union Cons	.40	.40	.40		.40	
Utah	.60				.60	.50
Wales Cons						
Yellow Jacket		.75	.65	.70		.65

Unlisted Stocks and Foreign Quotations.

We give below the most reliable quotations obtainable for unlisted stocks and quotations on outside and foreign exchanges :

NAME OF COMPANY.	Location.	Price.	Where quoted.
Adams, S. L.	Colo.	$4@$5	Unlisted
Bellevue, S. L.	Idaho	$5	Unlisted
Big Bend H'dr'lc, G.	Dak.	$5	Unlisted
Bird's Eye Creek, G.	Cal.	$6.25@$7.50	London
Bonanza King, G	Cal.	$10	Unlisted
California, G	Colo.	50@75c.	London
Colo. United, S. L.	Colo.	$12.50@$13.75	London
Eb'rh'dt & Mon't'r, S	Nev.	$1.50@$1.75	London
Elkhorn, G. S.	Mont.	$10	Unlisted
Golden River, G	Cal.	$116*	Paris
" Parts Civiles	Cal.	$46*	Paris
Granite Mt., S.	Mont.	$24@$24.50	St. Louis
Helene, G. S. L. C.	Mont.	$2	Helena
Honorine, S L	Utah	75c.	Unlisted
Kohinoor & Donaldson, G. S.	Colo.	50@62c.	London
La Plata, S. L.	Colo.	$1.00@$1.50	London
La Trinidad, S.	Mex.	$25.00@$27.50	London
Lexington, G. S.	Mont.	$12	Paris
" Org'niz'rs' shares	Mont.	40c.	Paris
Montana, Lt., G. S.	Mont.	$28.75@$30.00	London
New Albion, G.	N. S.	$4.50@$5.00	London
New Emma, S.	Utah	75c.@$1.00	London
New Hoover Hill, G. S	N. C.	$1.00@$1.25	London
Plumas Eureka, G.	Cal.	$3.12½@$4 37½	London
Richmond Con., S. L	Nev.	$23.12½@$24.37½	London
Ruby & Dunderberg, G.	Nev.	$1.37@$1.62	London
Russell Gold, G	N. C.	75@87c.	London
Sierra Buttes, G	Cal.	$6.87½@$8.12½	London
Silver Queen United, S.	Mex.	$10.00@$10.62½	London
Sonora		$1.30@$1.85	St. Louis
St. Joseph's, L	Mo.	$7@$7.50	Unlisted
United Mexican, S.‡	Mex.	$14.37½@$15.62½	London

Foreign quotations are per mail advices.
* The above quotations were given July 5th, 1885. Since then, there have been no quotations. ‡ New issue.

DIVIDENDS.

PLYMOUTH CONSOLIDATED GOLD MINING COMPANY, 23 NASSAU STREET.
NEW YORK, March 26, 1886.
DIVIDEND NO. 35.
The Board of Trustees have declared a dividend of TWENTY-FIVE THOUSAND DOLLARS, the same being *twenty-five cents* per share of the capital stock of the company, payable on the fifth day of April, at the Company's offices in New York and San Francisco.
W. VAN NORDEN, President.

OFFICE OF THE ADAMS MINING COMPANY, SECRETARY'S OFFICE, 280 BROADWAY,
NEW YORK, April 10, 1886.
DIVIDEND NO. 22.
A dividend of 10 cents per share, being fifteen thousand ($15,000) dollars, will be payable to the stockholders of record, on and after the 20th day of April, 1886, at the office of the Farmers' Loan and Trust Company, Nos. 20 and 22 William Street, New York City.
Transfer-Books will close on the 15th, and reopen on the 22d day of April, 1886.
JAMES DUNNE, Sec. THOMAS D. ADAMS, Pres.

HOMESTAKE MINING CO., MILLS BUILDING, 15 BROAD STREET,
NEW YORK, April 15, 1886.
DIVIDEND NO. 93.
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